



AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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INTRODUCTION

Aerospace Medicine and Biology is a continuing bibliography which, by means of periodic supplements, serves as a current abstracting and announcement medium for references on this subject. The publication is compiled through the cooperative efforts of the American Institute of Aeronautics and Astronautics (AIAA) and NASA Scientific and Technical Information Facility. It assembles, within the covers of a single bibliographic announcement, groups of references that were formerly announced in separate journals, and provides a convenient compilation for medical and biological scientists. Additional background details for this publication can be found in the first issue, NASA SP-7011, which was published in July, 1964. Supplements are identified by the same number followed by two additional digits in parentheses.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis will be placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

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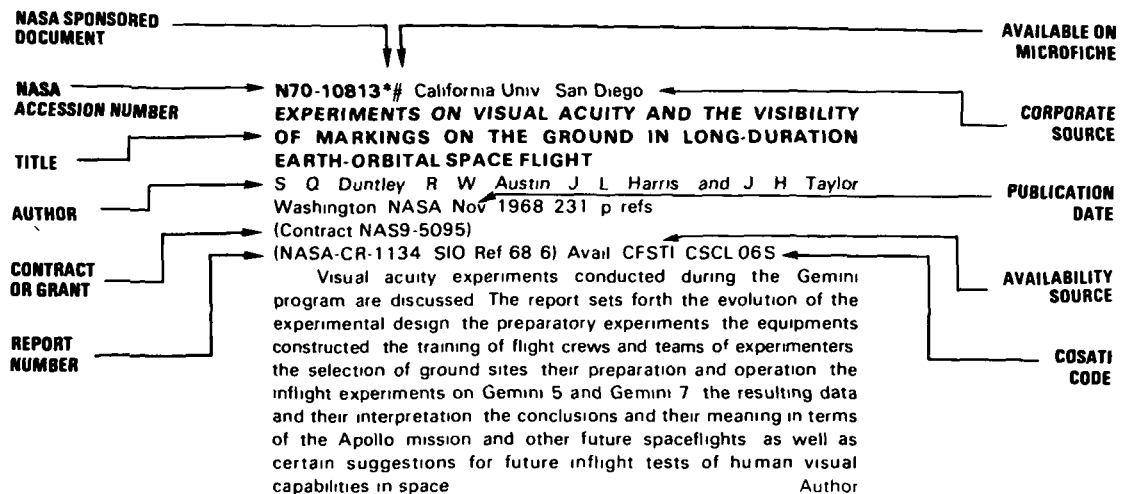
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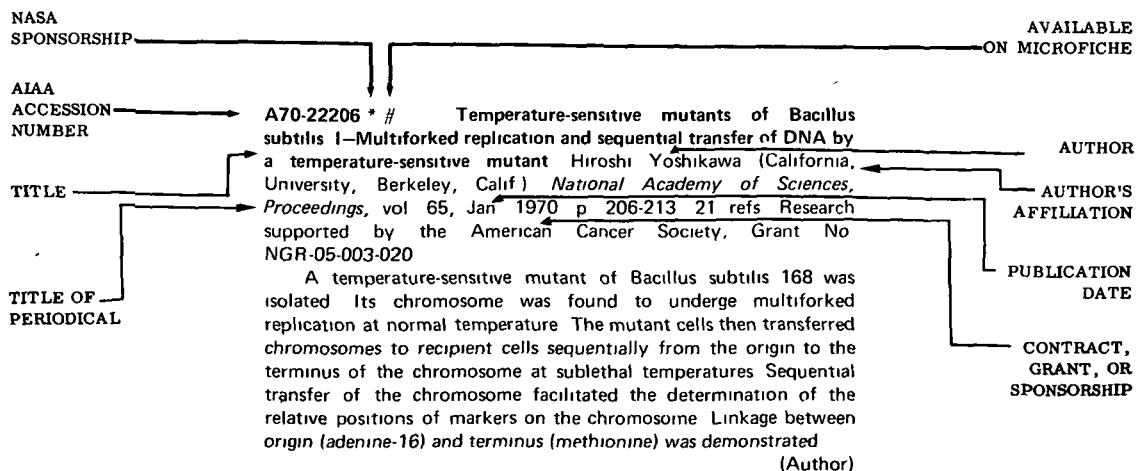
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TYPICAL CITATION AND ABSTRACT FROM IAA





AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography

JUNE 1970

STAR ENTRIES

N70-21127# Joint Publications Research Service Washington
D C
SPACE BIOLOGY AND MEDICINE, VOLUME 3, NO 6, 1969
26 Feb 1970 133 p refs Transl into ENGLISH from Kosmich
Biol i Med (Moscow) v 3 no 6 Nov - Dec 1969 p 1 83
(JPRS-49928) Avail CFSTI

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FORMALDEHYDE FOR CARBOHYDRATE SYNTHESIS IN
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(See N70-21128 09-06)

2 EFFECT OF SYNTHETIC CARBOHYDRATES ON GROWTH
AND TOXIN FORMATION OF TYPE-A cl perfringens G F
Shemanova p 27-32 refs (See N70-21129 09-05)

3 EFFECT OF PROLONGED HYPOTHERMIA ON CONTENT
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PROTEINS IN LARGE HEMISPHERES OF RATS L M Slez
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5 PROLIFERATIVE ACTIVITY OF BONE MARROW IN
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p 45-50 refs (See N70-21132 09-04)

6 EFFECT OF DIFFERENT DECOMPRESSION RATES ON
ALTITUDE TOLERANCE OF RATS A V Sergiyenko p 51-58
refs (See N70-21133 09-04)

7 TOXICOLOGY OF SOME POLYMERS V D Yablochkin
p 59-71 refs (See N70-21134 09-06)

8 BASIC PRINCIPLES FOR DEVELOPMENT OF
ACCELERATION TRAINING SCHEDULES V I Stepantsov et al
p 72-82 refs (See N70-21135 09-05)

9 EFFECT OF DIET CONTAINING DESTROYED CELLS
OF UNICELLULAR ALGAE ON COMPOSITION OF ENTERIC
MICROFLORA V M Shilov et al p 83-88 refs (See N70-21136
09-04)

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TOLERANCE B B Yegerov et al p 96-101 refs (See
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(See N70-21139 09-05)

13 A METHOD FOR CONTINUOUS REGISTRY OF
BIOELECTRIC ACTIVITY OF THE ANTERIOR AND POSTERIOR
SPINAL CORD NERVE ROOTS IN DOGS S A Skuratova et al
p 109-113 refs (See N70-21140 09-04)

14 DYNAMICS OF ELIMINATION OF 5-OXYINDOLEACETIC
ACID IN RATS DURING PROLONGED HYPOKINESIA Z S
Dolgun et al p 114-115 (See N70-21141 09-04)

15 EFFECT OF HYPOKINESIA ON CONDITIONED REFLEX
ACTIVITY OF WHITE RATS L N Khruleva p 116-118 refs
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DIOXIDE CONTENT V S Moskalenko p 119-121 refs (See
N70-21143 09-05)

N70-21129# Joint Publications Research Service Washington
D C

**EFFECT OF SYNTHETIC CARBOHYDRATES ON GROWTH
AND TOXIN FORMATION OF TYPE-A**

G F Shemanova *In its Space Biol and Med* Vol 3 No 6 26
Feb 1970 p 27-32 refs (See N70-21127 09-04)

Avail CFSTI

Synthetic carbohydrate effects on the growth and toxin
formation of type-A *Cl perfringens* has shown that they cause an
insignificant inhibition of these processes Author

N70-21130# Joint Publications Research Service Washington
D C

**EFFECT OF PROLONGED HYPOTHERMIA ON CONTENT
OF AMMONIA, GLUTAMINE AND AMIDE GROUPS OF
TOTAL PROTEINS IN LARGE HEMISPHERES OF RATS**

L M Slez *In its Space Biol and Med* Vol 3 No 6 26 Feb
1970 p 33-38 refs (See N70-21127 09-04)

Avail CFSTI

Artificial hypothermia was induced in rats by the combined
technique of hibernation and external cooling. The administration
of a lytic mixture to rats did not change the content of ammonia,
glutamine and amide groups of total proteins in cerebral tissue.
Cooling of rats to 18-20 deg also did not alter the level of
glutamine and amide groups in cerebral tissues. However the
ammonia level rose slightly. When a body temperature of 18-20
deg was maintained for 24 hours the ammonia content decreased
more than during the initial period of hypothermia but did not differ
from the initial level. The glutamine level increased significantly.
There was also a tendency to a reduction in the easily hydrolyzed
and bound amide groups of total cerebral proteins Author

N70-21131# Joint Publications Research Service Washington
D C

EFFECT OF GAS MEDIUM ON BODY TOLERANCE TO

LOW TEMPERATURES

I P Shcherbachev *In its Space Biol and Med* Vol 3 No 6
26 Feb 1970 p 39-44 refs (See N70-21127 09-04)
Avail CFSTI

A four-hour exposure of white mice to atmospheres with an increased content of carbon dioxide (5-7 percent) oxygen (35-40 percent) or both gases brought about a decrease in their rectal temperature. Carbon dioxide produced the highest hypothermal effect, whereas oxygen induced the lowest. During subsequent exposure to low temperatures (-25 and -50 C) the animals preexposed to a hypercapnic atmosphere exhibited the lowest rate of rectal temperature decrease and their death occurred at lower rectal temperatures in comparison with the control animals. It is suggested that an increased carbon dioxide concentration in the atmosphere may increase the tolerance of mice to low temperatures. Author

N70-21132# Joint Publications Research Service Washington, D C

PROLIFERATIVE ACTIVITY OF BONE MARROW IN DOGS DURING CHRONIC gamma-IRRADIATION

T M Zukhbaya *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 45-50 refs (See N70-21127 09-04)
Avail CFSTI

The mitotic activity and chromosomal aberrations in the bone marrow of dogs exposed to chronic gamma irradiation in doses of 25, 75 and 150 R per year were studied. No noticeable changes were found in proliferative activity. An increase in chromosomal aberrations was seen in animals irradiated in doses of 75 and 150 R per year. Author

N70-21133# Joint Publications Research Service Washington, D C

EFFECT OF DIFFERENT DECOMPRESSION RATES ON ALTITUDE TOLERANCE OF RATS

A V Sergiyenko *In its Space Biol and Med*, Vol 3 No 6 26 Feb 1970 p 51-58 refs (See N70-21127 09-04)
Avail CFSTI

An investigation of the effect of different decompression rates on the altitude tolerance of animals (white rats) revealed a distinct relationship between them and changes in animal tolerance to acute hypoxia. The study revealed that the decompression rate is of independent biological significance in the hypoxia tolerance, with an increase in the decompression rate the altitude ceiling increases and the period of sustained activity progressively decreases. In the case of a slowly increasing hypoxia the basic effect is on the cardiovascular respiration, circulation and heat control systems, whereas in the case of a rapidly increasing hypoxia the main effect is on the central nervous system. Author

N70-21135# Joint Publications Research Service Washington, D C

BASIC PRINCIPLES FOR DEVELOPMENT OF ACCELERATION TRAINING SCHEDULES

V I Stepanov et al *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 72-82 refs (See N70-21127 09-04)
Avail CFSTI

Experiments were performed with 37 animals (dogs) and 22 test subjects. In animal experiments the efficiency of three schedules was evaluated from variations in the maximum tolerable accelerations, as well as on the basis of physiologic, morphologic and histochemical changes in the body. In human experiments the efficiency of two schedules was evaluated. The schedules differed in the number of rotations, intervals between rotations and the degree of accomplishment of the main training objectives. These studies resulted in formulation of the basic requirements which should serve as the basis for rational schedules for the training of

animals and humans in order to increase their tolerance to transverse accelerations. Author

N70-21136# Joint Publications Research Service Washington, D C

EFFECT OF DIET CONTAINING DESTROYED CELLS OF UNICELLULAR ALGAE ON COMPOSITION OF ENTERIC MICROFLORA

V M Shilov et al *In its Space Biol and Med* Vol 3 - No 6 26 Feb 1970 p 83-88 refs (See N70-21127 09-04)
Avail CFSTI

This paper surveys studies of enteric microflora in animals and human beings who were fed diets containing different protein sources. In animals a diet containing casein resulted in a decrease in the concentration of lactobacilli, whereas a diet containing proteins of unicellular algae caused an increase in the number of sporiferous anaerobic bacteria. These changes may be associated with the properties of these proteins. In human subjects diets containing proteins of unicellular algae produced a decrease in the concentration of bifidobacteria and lactobacilli. It is shown that large quantities of biomass obtained using the present-day treatment method cannot be recommended for human nutrition. Further studies must be made to develop improved methods for separating the substance of unicellular algae and for producing easily assimilated protein products. Author

N70-21137# Joint Publications Research Service Washington, D C

FOOD RATION FOR SPACESHIP CREWS FOR FLIGHTS LASTING ONE MONTH

V P Bychkov et al *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 89-95 refs (See N70-21127 09-04)
Avail CFSTI

Testing of space diets revealed that in environments with daily energy expenditures of 34 Cal/kg of body weight the mean daily human requirements for nutrients and water, calculated for the assimilable portion, were: proteins - 15 g, fats - 12 g, carbohydrates - 41 g and water - 28 g per kg of body weight. The studies revealed that the metabolic parameters varied within a range which produced no abnormalities in health among the subjects. Author

N70-21138# Joint Publications Research Service Washington, D C

EFFECT OF ELECTRICAL STIMULATION OF LOWER EXTREMITY MUSCLES ON INCREASED ORTHOSTATIC TOLERANCE

B B Yegerov et al *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 96-101 refs (See N70-21127 09-04)
Avail CFSTI

The cardiovascular reaction of nine healthy male test subjects to a passive orthostatic test was studied. Every subject was exposed to the test twice: a control test and a test accompanied by muscular electrical stimulation. The inducement of controlled muscular contractions increased orthostatic tolerance. This was confirmed by the subjective feelings of the subjects and by an objective decrease in the absolute value of the heart rate and by an increased pulse rate when in an erect position. Author

N70-21139# Joint Publications Research Service Washington, D C

ALVEOLAR VENTILATION AND PULMONARY CIRCULATION UNDER THE INFLUENCE OF NEGATIVE PRESSURE ON THE LOWER BODY

A M Genin et al *In its Space Biol and Med* Vol 3 No 6
26 Feb 1970 p 102-108 refs (See N70-21127 09-04)
Avail CFSTI

Experiments were performed on 11 healthy male test subjects in the age range from 21 to 40 years who were subjected to negative pressure on the lower body (up to 80 mm Hg). On the basis of physiological reactions the test subjects were classified into those tolerant and not tolerant to such exposure. Due to the pooling of part of the circulating blood in the lower body and a decrease in venous return the arterioalveolar pCO₂ difference increased the physiological and alveolar dead space increased. These changes were more pronounced in the test subjects who appeared nontolerant to negative pressure on the lower body. Study of alveolar pCO₂ dynamics may be of prognostic importance in evaluating the health of test subjects. Progressive reduction of alveolar pCO₂ is indicative of increasing circulatory disturbances.
Author

N70-21140# Joint Publications Research Service Washington D C

A METHOD FOR CONTINUOUS REGISTRY OF BIOELECTRIC ACTIVITY OF THE ANTERIOR AND POSTERIOR SPINAL CORD NERVE ROOTS IN DOGS

S A Skupatova et al *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 109-113 refs (See N70-21127 09-04)
Avail CFSTI

A method for the permanent implanting of electrodes is briefly described. The nerve root was grasped with a small glass hook, a point prick was made in the nerve membrane with an injection needle, and the electrode was inserted along the path of the nerve fiber through this opening using forceps. A second electrode was introduced into the same nerve through another opening. The embedded electrodes were fastened by attaching a fine silk ligature to the spinal cord dura mater or to the membrane of the nerve, and the leads were fastened to the spinous processes of the vertebrae.
Author

N70-21141# Joint Publications Research Service Washington D C

DYNAMICS OF ELIMINATION OF 5-OXYINDOLEACETIC ACID IN RATS DURING PROLONGED HYPOKINESIA

Z S Dolgun et al *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 114-115 (See N70-21127 09-04)
Avail CFSTI

Male rats of the Wistar line weighing 170-180 g were used. Rats of the control group were kept in individual metabolism cages. The animals of the experimental group were placed in isolated hypokinesia movable cages which severely restricted their mobility and made it possible to collect the urine and feces separately. During the entire experiment the animals were kept on a special diet. The 5-OIAA content was determined in the daily urine volume. Results indicate that during the first three days reactions of the stress type predominate due to hypokinesia and isolation. By the end of the second week changes appeared which were obviously caused by the effect of hypokinesia itself. It is concluded that hypokinesia causes definite shifts in serotonin metabolism.
Author

N70-21142# Joint Publications Research Service Washington D C

EFFECT OF HYPOKINESIA ON CONDITIONED REFLEX ACTIVITY OF WHITE RATS

L N Khruleva *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 116-118 refs (See N70-21127 09-04)
Avail CFSTI

The state of the higher parts of the central nervous system in white rats during 30-day hypokinesia and during the aftereffect period. Twenty-seven white rats were used in the experiment.

these animals were first instilled with a stereotype of motor-food procuring conditioned reflexes consisting of four positive conditioned reflexes to a tone of 1 000 oscillations per second and differentiation to a tone of 300 oscillations per second. White bread rolled into a ball was the unconditioned reinforcement. During the course of forming the stereotype of conditioned reflexes lasting 3-1/2 months the animals were weighed three times. Prior to placing the rats into special frames sharply restricting movement their temperatures were measured. Nine animals were kept under ordinary conditions as a control. All animals received ordinary diets. The conditioned reflexes of each rat were investigated on the 6th, 16th, 23rd and 30th days. For a period of five or six minutes they were removed from the restraining frame and placed in a conditioned reflexes chamber (after they were examined, weighed and had their temperature measured).
Author

N70-21143# Joint Publications Research Service Washington D C

EFFECT EXERTED ON HUMAN BODY BY BRIEF EXPOSURE IN AN ATMOSPHERE WITH AN INCREASED CARBON DIOXIDE CONTENT

V S Moskalenko *In its Space Biol and Med* Vol 3 No 6 26 Feb 1970 p 119-121 refs (See N70-21127 09-04)
Avail CFSTI

The subjects were 20 seated males ages 23-39. Breathing was through a modified KM-30 M oxygen mask. A gas mixture with a definite carbon dioxide concentration was fed under the mask. At the end of the first and second hours of exposure the subject performed light physical work equal to 300 kgm/min. The effects from breathing air with a content of 2, 3 and 4 percent carbon dioxide/20.5, 20.3 and 19.9 percent oxygen were recorded. An analysis of the subjective data revealed that the degree of expression and frequency of unfavorable subjective sensations in the subjects are dependent primarily on the carbon dioxide concentration. When breathing air containing 2 percent carbon dioxide content was 3 or 4 percent some of them noted heaviness in the head, difficulty in performing a cardiac-pulmonary test and complained of headache and malaise. In studying the respiratory function it was noted that when the breathed air contained 3 or 4 percent carbon dioxide the respiration rate increases considerably.
Author

N70-21148# Pittsburgh Univ Pa Dept of Biophysics and Microbiology

A STUDY OF THE MECHANISM OF PHOTSENSITIZATION IN PHOTOSYNTHESIS Final Report, 1 May-31 Aug 1968

Jerome L Rosenberg 10 Nov 1969 9 p refs
(Contract NONR-624(08))
(AD-697689) Avail CFSTI CSCL 6/1

A summary is given of work in the following areas: Fluorescence in red algae; Endogenous reactions of spinach chloroplasts; Hill reaction rates and yields at low light dosages.
TAB

N70-21169# Naval Medical Research Inst Bethesda Md
EVALUATION OF THE NSRD6 HEATER PUMP PERFORMANCE CHARACTERISTICS AND RELIABILITY Medical Research Interim Report

David L Jackson, John F Tauber and John S P Rawlins 7 Aug 1969 22 p refs
(AD-694023 NAVMED-M4306-02-6010B-1) Avail CFSTI CSCL 6/17

Experiments to evaluate the performance of the NSRD6 heater pump were performed in a cold tank. One to three divers were employed, each wearing a 3/16-inch foam neoprene wet suit over a Welson Tubing suit. The system was observed during over 10 hours of testing. The divers were maintained in these conditions at varying flow rates and suit inlet temperatures.
Author (TAB)

N70-21172 National Lending Library for Science and Technology Boston Spa (England)

THE SIGNIFICANCE OF SOLAR RADIATION AND INTERACTION OF PHYSICO GEOGRAPHICAL FACTORS IN THE ECOLOGY OF ANIMALS IN DIFFERENT LANDSCAPES

I D Strel'nikov 21 Oct 1969 20 p refs Transl into ENGLISH from Akad Nauk Inst Geog Probl Fiz Geog (Moscow) v 13 1968 p 145-155

(NLL-M-7830-(5828 4F)) Avail Natl Lending Library Boston Spa Engl 2 NLL photocopy coupons

Cosmic and thermal effects of solar radiation on earth's ecology is evaluated emphasising effects on plant and animal temperatures Factors determining the body temperature of cold-blooded animals are considered with wind evaporation and humidity as ecological factors Diurnal variations of body temperature of cold-blooded animals in different areas are compared along with direct and scattered solar radiation effects Thermal conditions in the internal medium of animals are cited Results indicate that interactions of various ecological factors in different areas give similar effects and thermal conditions in the internal tissues of cold-blooded terrestrial animals during active life J A M

N70-21246* Lockheed Missiles and Space Co Palo Alto, Calif Research Lab

EFFECTS OF MANNED OCCUPANCY ON SPACECRAFT MATERIALS

L L Reed *In its Space Mater Handbook* 1969 p 659-672 refs (See N70-21226 09-17)

Avail CFSTI HC\$10 00/MF\$0 65 CSCL 06F

The effect is studied of the biological products related to or of man on spacecraft materials These are either the excretions and secretions of normal metabolic activity, or materials of biological origin that are associated with the presence of man and include urine, feces, sweat, tears vomit, sebum flatus and respiratory products The constituents and their concentrations in these various products are presented and potential problem areas are discussed The data are summarized in tables F O S

N70-21261# Technology, Inc., San Antonio Tex Life Sciences Div

EVALUATION OF EYE HAZARDS FROM NUCLEAR DETONATIONS PART 1 RETINAL BURNS AND FLASHBLINDNESS Final Report, 20 Dec 1967 - 30 Jun 1969

Norma D Miller, Thomas J White William H Bowie, William R Bruce, and Charles E Bryson Nov 1969 74 p refs

(Contract F41609-68-C-0023)

(AD-697425) Avail CFSTI CSCL 6/5

White light primate retinal burn thresholds are reported for both foveal and extramacular regions Rabbit and primate retinal burn thresholds are reported for a ruby laser used in the normal semi-Q-switched and Q-switched modes Human flashblindness recovery time data are given for various flash field sizes and various recovery targets A new double light source system for producing simulated nuclear detonations is described A mathematical model for the prediction of retinal temperatures is developed Safe separation distance estimates are given at selected times for both 10 second recovery flashblindness and retinal burns for yields of 0.1 to 10 000 KT and burst heights to 50 KT high and low visibility atmospheres and pupil diameters of 3 and 7 mm are additional parameters The retinal burn estimates are based on primate exposure data gathered during the previous eighteen months Author (TAB)

N70-21292# School of Aerospace Medicine Brooks AFB Tex
MINIATURE TRANSDUCERS FOR MEASUREMENT OF CARDIAC DIMENSIONS Final Report, May 1968 - Apr 1969

Ed Matney Oct 1969 15 p refs

(AD-697386 SAM-TR-69-62) Avail CFSTI CSCL 6/12

Large ultrasonic transducers have been used in the past to measure changes in the internal dimensions of the left ventricle of experimental animals but these large transducers were difficult to insert into the ventricular chamber Also they tended to produce cardiac lesions if extra care in placement were not taken The report describes the fabrication and use in experimental animals of miniature sonomicrometer transducers that are approximately half the size of the older ones The new miniature transducers have been used for the past 12 months without causing any cardiac problems and are exceedingly easy to insert into the left ventricular chamber They are considered superior to the larger transducer and should be used in work involving the measurement of cardiac or vascular dimensions Author (TAB)

N70-21294# School of Aerospace Medicine Brooks AFB Tex
A MODIFIED 125I PLASMA VOLUME PROCEDURE Final Report, May-Jul 1969

Donald F Logsdon Jr James F Green and John W Harper Oct 1969 16 p refs

(AD-697387 SAM-TR-69-63) Avail CFSTI CSCL 6/18

Reducing the radiation exposure dose from radioisotope procedures is a constant requirement of the radioisotope laboratory A modified RISA-125I plasma volume procedure has now been developed which, without sacrificing accuracy reduces the exposure dose by a factor of 10 Curves are also presented which permit selection of a minimum plasma sample or a minimum dose of RISA-125I with short or long counting times Author (TAB)

N70-21300# Commissariat a l'Energie Atomique Saclay (France) Centre d'Etudes Nucleaires

THEORETICAL AND EXPERIMENTAL RESEARCH INTO THE HETEROGENEOUS POISONING OF FISSILE MATERIAL SOLUTIONS BY TUBES OR RINGS OF BOROSILICATE GLASS [ETUDE EXPERIMENTALE ET THEORIQUE DE L'EMPOISONNEMENT METEORGENE DE SOLUTION DE MATIERE FISSILE PAR DES TUBES OU DES ANNEAUX IN VERRE AU BOROSILICATE]

Francis Barbry Jean-Claude Bouly Robert Caizergues Edouard Delgat Michel Houelle et al Dec 1969 127 p refs In FRENCH ENGLISH summary

(CEA-R-3931) Avail CFSTI

This report collects together experimental results obtained with plutonium nitrate solutions poisoned by borosilicate glass tubes or rings and the results of calculations carried out by various techniques are compared with them These techniques make it possible to calculate the values of the critical concentrations in an infinite medium and of the critical masses and volumes for aqueous solutions of plutonium and uranium poisoned by borosilicate glass rings Author (ESRO)

N70-21306# SysteMed Corp., Newport Beach Calif
PROPOSED EMERGENCY EXPOSURE LIMITS FOR MONOMETHYLHYDRAZINE Final Report, Nov 1967 - Oct 1968

J D Mac Ewen, C C Haun, G F Egan and E H Vernot Sep 1969 22 p refs

(Contract F33615-67-C-1025)

(AD-697412, W69004, AMRL-TR-69-38) Avail CFSTI CSCL 6/20

Current EEL values for monomethylhydrazine (MMH) a rocket propellant, have been based on minimal information consisting primarily of acute effects The acute effects of MMH are seen only at lethal or supra-lethal dose levels and consequently a series of experiments were conducted to define an atmospheric concentration

of MMH which would produce no irreversible injury and no clinical evidence of central nervous system (CNS) injury. Dogs, monkeys, rats and mice were exposed to MMH vapors for periods of 15, 30, and 60 minutes to concentration x time (CT) doses of 900 ppm-minutes. The 900 ppm-minute CT dose of MMH, which was 25% of the LC concentration for the most susceptible animal species tested, included a safety margin below the lowest dose reported to produce marginal decrement of performance in trained cats and monkeys. In view of the negative finding in all species exposed to the 900 ppm-minute CT dose level of MMH, we recommend an upward revision of current emergency exposure limits (EEL) values. Author (TAB)

N70-21310# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF CHLORINE GAS Technical Report

Quade R Stahl Sep 1969 92 p refs

(Contract PH-22-68-25)

(PB-188087) Avail CFSTI CSCL 13B

Reports are included on Chlorine gas effects on humans (Acute effects Chronic effects Sensory thresholds Synergistic effects Chlorine gas exposure to communities through accidents) Effects on animals Effects on plants (Phytotoxicity Sensitivity of plants Effect of moisture Effect of light Effect of water stress Plant accumulations Episodes of plant damage) Effects on materials Environmental air standards Natural occurrence Production sources (Electrolytic diaphragm cells Electrolytic mercury cells Fusion electrolysis of chloride salts) Product sources (Chlorinated organic chemicals Other organic chemicals Inorganic chemicals) Environmental air concentrations Abatement (Water scrubbers Alkali scrubbers Carbon tetrachloride scrubbers) Economics Methods of analysis USGRDR

N70-21318# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF CADMIUM AND ITS COMPOUNDS Technical Report

Yanis C Athanassiadis Sep 1969 92 p refs

(Contract PH-22-68-25)

(PB-188086) Avail CFSTI CSCL 13B

Contents Effects on humans (Respiratory systems Cardiovascular system Carcinogenesis) Effects on animals Effects on plants Effects on materials Environmental air standards Natural occurrence Production sources Product sources Environmental air concentrations Abatement Economics Methods of analysis USGRDR

N70-21319# RAND Corp Santa Monica Calif
THE RESPONSIBLE ROLE OF THE ATMOSPHERIC SCIENCES IN DETERMINING THE FUTURE QUALITY OF MAN'S ENVIRONMENT

S M Greenfield Nov 1969 13 p Presented at the Symp on the future of Atmospheric Sci Madison Wis 21 Oct 1969 (AD-697417 P-4241) Avail CFSTI CSCL 4/2

In attempting to predict the probable directions of the atmospheric sciences as a discipline into the future, the document discusses the question of what atmospheric sciences have to contribute to the future of man. Author (TAB)

N70-21408# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF SELENIUM AND ITS COMPOUNDS

Quade R Stahl comp Sep 1969 88 p refs

(Contract PH-22-68-25)

(PB-188077) Avail CFSTI CSCL 13B

Contents Selenium s and selenium compounds effects on humans (chronic effects acute poisoning retention and elimination detoxification selenium in nutrition elemental selenium selenium dioxide selenites selenates hydrogen selenide selenium oxychloride organoselenium compounds) Effects on animals Effects on plants (selenium indicator plants secondary selenium absorbers grains vegetables grasses other vegetation) Effects on materials Environmental air standards Natural occurrence Production sources Product sources Environmental air concentrations Abatement Economics Methods of analysis USGRDR

N70-21409# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF HYDROCHLORIC ACID

Quade R Stahl comp Sep 1969 82 p refs

(Contract PH-22-68-25)

(PB-188067) Avail CFSTI CSCL 13B

Effects on humans (toxicity, sensory thresholds synergistic effects) Effects on animals Effects on plants (phytoxicity incidents of plant damage) Effects on materials Environmental air standards Natural occurrence Production sources (by-product process salt-acid process chlorine-hydrogen synthesis) Product sources Other sources (coal fuel oil automobile exhaust burning of chloride-containing plastics burning of paper products DDT production lemon pulp extraction) Environmental air concentrations USGRDR

N70-21418# Naval Submarine Medical Center Groton Conn Submarine Medical Research Lab

MAGNETOMETER RESPIROMETER FOR LABORATORY AND DIVING STUDIES

Wayne H Miller Ted L Parrot James H Dougherty Jr and Karl E Schaefer 16 Jun 1969 9 p refs

(AD-697649 SMRL-MR-69-4) Avail CFSTI CSCL 6/12

A system utilizing two pairs of magnets placed on the thorax and abdomen has been constructed and tested. It eliminates the use of mouthpieces, face masks, and plethysmographic methods for the measurement of respiratory tidal volume and respiratory rate. This is frequently desirable in laboratory studies to eliminate the artifacts produced by the use of the older methods and with the addition of a miniature tape recorder and pressureproof underwater housing would allow accurate measurements on SCUBA, Hoka hard-hat, and breathhold divers. This method provided a 2-2.8% one standard deviation error in the supine position and a 4.2% error in the sitting position. The second subject had a 6.0% error while sitting. Author (TAB)

N70-21430*# Stanford Univ Calif

DYNAMICS OF HUMAN SELF-ROTATION

Thomas R Kane In JPL Proc of the 4th Aerospace Mech Symp

15 Jan 1970 p027-32 refs (Seq N70-21426 09-31)

(Grant NGR-05-202-209)

Avail CFSTI CSCL 06C

Self rotation of astronauts by moving various parts of the body is discussed in reference to results obtained from dynamical analyses dealing with yaw, pitch, and roll motions. A pitch maneuver and two yaw maneuvers are considered in detail. One of the latter is similar to the righting movements of a falling cat, whereas the other involves conical motions of arms or legs. Author

N70-21449# Sloan-Kettering Inst for Cancer Research New York

BIOLOGICAL EFFECTS OF RADIATION AND RELATED

BIOCHEMICAL AND PHYSICAL STUDIES Progress Report, 1 May 1968 - 1 May 1969

John S Laughlin Ira Pullman and Nikitas D Kessariss 30 Sep 1969 9 p refs
(Contract AT(30-1)-910)
(NYO-910-121) Avail CFSTI

Progress is reported on free radical production in biologically significant compounds and on theoretical investigations of electron LET spectra and dose relations for ionizing radiations Areas investigated were protective mechanisms in x-irradiated systems of DNA and Sulfhydryl compounds (ESR spectroscopy studies) the negative ions of polycyclic hydrocarbons assay of free radicals in uv-irradiated purine N-oxides spin-labeling studies for analysis of hormone-membrane interactions and electronic instrumentation for ESR studies in relation to computer analysis A set of depth-dose and dose-LET distributions in water for cyclotron-produced neutron beams is discussed and the variations of the ratio of absorbed dose to cavity ionization as a function of depth penetration of a 20 MeV electron beam in carbon is presented in graphic form NSA

N70-21450# Atomic Energy Commission Research Establishment Riso (Denmark) Health Physics Dept ENVIRONMENTAL RADIOACTIVITY IN THE FAROES IN 1968

A Aarkrog and J Lippert Jul 1969 20 p refs
(RISO-202) Avail CFSTI

Measurements of fall-out radioactivity in the Faroes in 1968 are presented Sr-90 (and Cs-137 in most instances) was determined in regularly collected samples of precipitation grass milk fish bread and drinking water In addition analyses of spot samples of lamb, potatoes sea water sea plants birds and vegetables were carried out Estimates of the mean contents of Sr-90 and Cs-137 in the human diet in the Faroes in 1969 are given
Author (ESRO)

N70-21463# Institut fur Plasmaphysik G m b H Garching (West Germany)

INVESTIGATIONS OF THE METABOLISM IN BIOLOGICAL SYSTEMS USING MICROWAVE AND INFRARED SPECTROSCOPY [UNTERSUCHUNG UEBER DIE ANWENDUNGSMOEGELICHKEIT DER MIKROWELLEN- UND INFRAROTSPEKTROSKOPIE FUER DIE REGISTRIERUNG VON STOFFWECHSELVORGAENGEN IN BIOLOGISCHEN SYSTEMEN]

W Von Casimir O Gehre N Kaiser F Keilmann K Plank et al May 1969 27 p refs In GERMAN ENGLISH summary
(IPP-3/93) Avail CFSTI

An attempt was made to extend investigations of chemical reaction kinetics using a spectroscopic method to obtain data on the reaction agents as well as on any short life intermediates involved An attempt was made to record the intra-molecular resonances of the reaction agents in rapid succession over a wide frequency band but much more useful information was obtained by simultaneously measuring the attenuation and phase shift particularly with several resonances superposed and a basic circuit for this purpose is described The basic circuit of a single-frequency measuring bridge with a highly sensitive detector which also allows time changes in the magnitude and phase of individual resonances to be closely followed is also described Both circuits were first developed for the microwave range and can be adapted for the optical and infrared ranges with appropriate components The cis-trans isomerization of dichlorethylene and the oxidation and reduction of haemoglobin in aqueous solution etc were used to test the devices and the water dispersion attenuation and phase shift in the 3-cm band were recorded These spectroscopic methods can also be used in the frequency range of intra-molecular resonances for measuring specimens in aqueous solution (experiment in-vivo)
Author (ESRO)

N70-21464# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF BIOLOGICAL AEROSOLS (MICROORGANISMS)

Harold Finkelstein comp Sep 1969 109 p refs
(Contract PH-22-68-25)
(PB-188084) Avail CFSTI CSCL 13B

Biological aerosols—suspensions of microorganisms in the air—can cause diseases in humans animals and plants and degradation of inanimate materials The present knowledge pertaining to the relationships between dose-effect viability survival of microorganisms in aerosols and other factors is insufficient for establishing standards for either indoor or outdoor environmental air concentrations The source of most human and animal airborne pathogens is the host organism that recently harbored the pathogens However since biological aerosols generally are detrimentally affected by exposure to the atmosphere they are usually found in spaces close to the host The abatement and control of biological aerosols have been successful only in environmentally-controlled indoor spaces
Author (USGRDR)

N70-21476# Harry Diamond Labs Washington D C INSECT ACTIVITY SENSOR

Fabian T Liss and Peter Wemple Oct 1969 20 p
(AD-697733 HDL-TM-69-23) Avail CFSTI CSCL 6/3

A sensitive shielded capacitive sensor capable of monitoring the activity of insects was designed and fabricated The unit was designed around NASA specifications for possible inclusion in future space probes
Author (TAB)

N70-21502# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF ARSENIC AND ITS COMPOUNDS

Ralph J Sullivan comp Sep 1969 72 p refs
(Contract PH-22-68-25)
(PB-188071) Avail CFSTI CSCL 13B

Arsenic and arsenic compounds' effect on humans (carcinogenesis, community episodes), Effects on animals, Effects on plants Effects on materials, Environmental air standards Natural occurrence Production sources Product sources (pesticides, cotton gins) Environmental air concentrations Abatement Economics Methods of analysis
USGRDR

N70-21503# Litton Systems Inc Bethesda, Md Environmental Systems Div

AIR POLLUTION ASPECTS OF AEROALLERGENS (POLLENS)

Harold Finkelstein, comp Sep 1969 118 p refs
(Contract PH-22-68-25)
(PB-188076) Avail CFSTI CSCL 13B

Aeroallergens (pollens) are airborne materials which elicit a hypersensitivity response in susceptible individuals The two major responses exhibited are allergic rhinitis and bronchial asthma Ragweed pollen is the cause of more than 90 percent of pollinosis in this country Other aeroallergens include molds, house dust, danders, and a miscellaneous group of insecticides, cosmetics paints and vegetable fibers Pollen counts are taken daily in many local areas throughout the country These counts are used as guidelines for anticipating and understanding the incidence of pollinosis in a given area rather than as standards Local programs of ragweed eradication generally have met with little success in controlling pollen concentrations The pollen can be windborne for many miles and therefore pollen entering a city from the outside usually is sufficient to cause pollinosis in the susceptible

population The gravity slide method has been accepted as the standard procedure for pollen sampling by the Pollen Survey Committee of the American Academy of Allergy

Author (USGRDR)

N70-21516# Commissariat à l'Energie Atomique
Bruyères-le-Châtel (France)

EVALUATION OF AN INDIVIDUAL NEUTRON IRRADIATION BY A STUDY OF ITS BIOLOGICAL STIGMAS [EVALUATION D'UNE IRRADIATION NEUTRONIQUE INDIVIDUELLE PAR L'ETUDE DE SES STIGMATES BIOLOGIQUES]

Jacques Ventadour, Christiane Labat, and Jean-Jacques Chivot
Oct 1969 15 p refs In FRENCH ENGLISH summary
(CEA-R-3884) Avail CFSTI

It is likely that some victims may not be carrying dosimetric films when sudden neutron irradiation occurs so an attempt was made to estimate the dose received by measuring the gamma activity of the sodium-24 produced by the activation of the natural sodium in the organism. Anthropomorphic dummies were used to calibrate an anthropo-gamma-meter and a one-metre arc and the dummies were irradiated with a known neutron flux. The phosphorus-32 activation of the sulfur in the hair was also studied the irradiation being made in the presence of dosimetric film to establish a correlation between the induced activities and the doses received. In cases where the neutron flux is unknown this method allows one to estimate the dose and to rapidly group the victims as a function of the dose received.

Author (ESRO)

N70-21518# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF ORGANIC CARCINOGENS

Douglas A Olsen and James L Haynes Sep 1969 131 p refs
(Contract PH-22-68-25)

(PB-188090) Avail CFSTI CSCL 13B

Research was reported on the air pollution aspects of organic carcinogens including types of organic carcinogens organic carcinogens as cocarcinogens or anticarcinogens, the effects on humans the effects on animals the effects on plants the effects on materials their natural occurrence environmental air standards, production sources product sources environmental air concentrations, abatement sampling methods, extraction methods, separation, and spectroscopic analysis.

Author (USGRDR)

N70-21520# School of Aerospace Medicine Brooks AFB Tex
THE XYY SYNDROME AND AEROSPACE OPERATIONS

George K Cantrell Aug 1969 18 p refs

(AD-697406 SAM-REVIEW-5-69 SAM-TR-69-50) Avail CFSTI CSCL 6/5

This review covers (1) a brief survey of the findings and developments leading to the discovery of the XYY condition (2) an analysis of published materials pertaining to the XYY condition and (3) a discussion of the potential implications of the findings with an emphasis on one possible research approach to the condition.

Author (TAB)

N70-21521# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF BARIUM AND ITS COMPOUNDS

Sydney Miner, comp Sep 1969 69 p refs
(Contract PH-22-68-25)

(PB-188083) Avail CFSTI CSCL 13B

Soluble barium compounds are highly toxic when ingested while insoluble compounds such as the most common barium

compound, barium sulfate, are generally nontoxic. Inhaled barium compounds cause a benign pneumoconiosis called baritosis. Ingestion of soluble barium compounds results in strong stimulation of the muscles, including the heart irritation of the intestinal tract, and irritation of the central nervous system. The major sources of barium compounds emitted into the atmosphere are the industrial processes involved in the mining refining and production of barium and barium base chemicals, and the use of barium compounds as a fuel additive for the reduction of smoke emissions from diesel engines. Data have not been found on the quantity of emissions from industrial processes. Some limited data on barium emissions from diesel engine exhaust were estimated. No information is currently available on the concentration of barium or its compounds in ambient air, on the abatement of barium air pollution or on the costs of its abatement. Barium concentration is measurable.

Author (USGRDR)

N70-21522# Litton Systems, Inc Bethesda, Md Environmental Systems Div

AIR POLLUTION ASPECTS OF VANADIUM AND ITS COMPOUNDS

Yanis C Athanassiadis comp Sep 1969 105 p refs
(Contract PH-22-68-25)

(PB-188093) Avail CFSTI CSCL 13B

* Vanadium is toxic to humans and animals, especially in its prevalent form. Human exposure through inhalation of relatively low concentrations has resulted in inhibition of cholesterol synthesis, and chronic exposure to environmental air containing vanadium has been statistically related to mortality rates from heart diseases and certain cancers. Exposure to high concentrations results in physiologically observable effects of varying severity on the gastrointestinal and respiratory tracts. In general very little research has been done in the toxicity of environmental concentrations of vanadium. No information has been found on the effects of vanadium air pollution on commercial or domestic animals, plants, materials, economic losses, or on the cost of pollution abatement. The methods available for quantitative analysis of vanadium in the atmosphere including colorimetric, atomic absorption spectroscopy, emission spectroscopy and polarography, provide sensitivities in the 0.001 micrograms per cubic millimeter.

Author (USGRDR)

N70-21567# California Univ Los Angeles Psychology Dept
TRANSNATIONAL WORKING GROUP ON THE DYNAMICS OF CONFLICT Technical Report, 1 Mar - 31 Aug 1969

Harold H Kelley 31 Aug 1969 6 p

(Contract N00014-67-A-0111-0013 ARPA Order 1085)
(AD-697668 TR-4) Avail CFSTI CSCL 5/10

The report summarizes the joint research activities of thirteen experimental social psychologists from U.S. and European universities who are informally organized to plan and conduct studies on conflict between individuals and groups. New results are reported on interpersonal bargaining. The basis of ingroup-outgroup conflict and the effect of within-group relations upon intergroup relations.

Author (TAB)

N70-21569# Edison Water Quality Lab N J
BIOLOGICAL EFFECTS OF OIL POLLUTION BIBLIOGRAPHY A COLLECTION OF REFERENCES CONCERNING THE EFFECTS OF OIL ON BIOLOGICAL SYSTEMS

Donna R Radcliffe and Thomas A Murphy Oct 1969 52 p refs

(Contract DAST-19W70-02038)

(PB-188206) Avail CFSTI CSCL 06F

References on the biological effects of oil are listed according to the following categories: Publications on the general aspects of oil pollution; reports of oil spill incidents; general biological effects of oil and of specific oil spill incidents; effects of oil on birds.

effects of oil on fish effects of oil on shellfish effects of oil on freshwater invertebrates effects of oil on plants effects of oil on dissolved oxygen carcinogenic effects of oil and miscellaneous biological reports on oil Author (USGRDR)

N70-21575# Aerospace Medical Research Labs, Wright-Patterson AFB, Ohio

SUBJECTIVE ANALYSIS OF SPEECH IN HELIUM ENVIRONMENTS

Charles W Nixon and Henry C Sommer 1968 8 p refs Submitted for publication

(AD-698222, AMRL-TR-67-42) Avail CFSTI CSCL 6/11

The paper presents a review of speech communication in aerospace environments in which helium is used as a component of the life-sustaining atmosphere. Some physical and psychoacoustical factors that comprise speech in helium concentrations of 0 to 80 per cent and at pressures of 760 to 258 mm Hg are defined.

Author (TAB)

N70-21576# Aerospace Medical Research Labs, Wright-Patterson AFB, Ohio

EVALUATION OF ANIMALS CONTINUOUSLY EXPOSED TO A 5 PSIA PURE OXYGEN SPACE CABIN ATMOSPHERE FOR EIGHT MONTHS

Harold P Kaplan Anthony A Thomas Kenneth C Back and Farrel R Robinson 1968 9 p refs Submitted for publication

(AD-698221, AMRL-TR-67-24) Avail CFSTI CSCL 6/19

One hundred seventeen animals of 4 species were continuously exposed to a pure oxygen atmosphere at 5 psia total pressure for 235 days. Clinical observation, serial blood chemistries, biochemical determination of hepatic cellular respiration, and histopathologic examinations revealed no evidence of systemic oxygen toxicity. Light microscopy revealed changes in the lungs of dogs and electron microscopy revealed changes in the lungs of dogs and rats that could be related to the oxygen exposure. It is unclear whether these changes were the result of the prolonged exposure or of the sudden return to ambient air prior to sacrifice. They were not associated with any apparent pulmonary functional deficit.

Author (TAB)

N70-21578# Litton Systems Inc, Bethesda Md, Environmental Systems Div

AIR POLLUTION ASPECTS OF MERCURY AND ITS COMPOUNDS

Quade R Stahl Sep 1969 108 p refs

(Contract PH-22-68-25)

(PB-188074) Avail CFSTI CSCL 13B

Contents: Mercurys and mercury compounds effects on humans (absorption, distribution, excretion, inhibition of enzymes, toxicity). Effects on animals. Effects on plants. Effects on materials. Environmental air standards (mercury and its inorganic compounds, mercury organic compounds). Natural occurrence. Production sources. Product sources. Environmental air concentrations. Abatement. Methods of analysis.

USGRDR

N70-21580 Stanford Univ, Calif

THE MATHEMATICAL FORMULATION OF THE KINEMATIC PROPERTIES OF MUSCLE DERIVED FROM AN EXPERIMENTAL INVESTIGATION

Felix Edward Zajac III (Ph D Thesis) 1968 107 p

Avail Univ Microfilms HC \$5.40/Microfilm \$3.00 Order No 69-8304

The behavior of tetanic, maximally stimulated cat muscle in vivo was investigated. A conceptual model of a contractile element in series with an elastic element was used to guide the

analysis and to mathematically model the kinematic properties of cat muscle. A set of experiments was performed to specifically determine the properties of the series elastic element. The isometric muscle was quickly released and different constant forces less than the developed isometric force were applied. The force in the elastic element was found to increase exponentially with elastic length just as it did in previous studies on frog muscle. It was found that the elastic element in cat muscle could stretch to a length greater than 15% of the muscle's normal resting length, a value much larger than a comparable value of 2% in frog muscle. These differences in elastic stretch could result from the different environmental temperatures used in the preparations.

Dissert Abstr

N70-21615# Commissariat a l'Energie Atomique, Fontenay-aux-Roses (France), Centre d'Etudes Nucleaires

A STUDY OF THE BEHAVIOUR OF IRRADIATED OR NON-IRRADIATED GRAFTS IN THE CAMERA AQUOSA OF IRRADIATED AND NON-IRRADIATED ANIMALS [ETUDE DU COMPORTEMENT D'UN GREFFON IRRADIE OU NON, TRANSPLANTE DANS LA CHAMBRE ANTERIEURE DE L'OEIL D'UN ANIMAL IRRADIE OU NON]

Gholamreza Djalali-Behzad (Ph D Thesis—Paris Univ 26 Jun 1969)

Nov 1969 50 p refs In FRENCH, ENGLISH summary

(CEA-R-3901) Avail CFSTI

After grafting spinal ganglia of new born mice to the camera aquosa of adult mice, an attempt was made to graft hematopoietic tissue under the same conditions. The growth of isologous and heterologous bone marrow in the camera aquosa showed that this tissue, even after exposure to supralethal doses, was capable of survival and growth. A counter experiment with nonirradiated bone marrow grafts in the camera aquosa of rats given 700 rads led to the conclusion that the environment contaminated by exposure, acted on the graft so that after vascularization it was unable to grow.

Author (ESRO)

N70-21654 Arizona Univ, Tucson

COLD STRESS AND MICROCLIMATE IN THE QUECHUA INDIANS OF SOUTHERN PERU

Joel Michael Hanna (Ph D Thesis) 1968 143 p

Avail Univ Microfilms HC \$6.80/Microfilm \$3.00 Order No 69-4045

This dissertation deals with responses to cold at the population level. The population considered lives in a cold climate which is inhospitable to unprotected humans. The group is the Quechua Indians living in the Nunoa region of southern Peru and is especially suited to population analysis because numerous parameters have already been defined. The variations in response to cold stress encountered within the population are considered from three viewpoints. The first is related to the physical environment and rises from altitude, the salient geographic feature in this Andean region. The second viewpoint emphasizes biological variation. Combinations of laboratory and field studies illustrate variation which is related to age and sex. The male-female differences in the Quechua are distinct from those reported for other populations in that Quechua women maintain warmer surface temperatures than men. The final viewpoint is that of human culture. Clothing is examined from the viewpoint of design and suitability for cold climates. It is found to comply with standards prescribed for cold weather clothing by the U S Army.

Dissert Abstr

N70-21681*# Scripta Technica Inc, Washington D C

FRACTIONATION OF RAT PITUITARIES AND STUDY OF THE THYROTROPIC, GONADOTROPIC AND HETEROTHYROTROPIC ACTIVITIES OF THE PURIFIED PRODUCTS [FRACTIONNEMENT D'HYPOPHYSES DE RATS ET ETUDE DES ACTIVITES THYREOTROPE,

GONADOTROPES ET HETEROHYREOTROPE DES PRODUITS PURIFIES]

Y A Fontaine et al Washington NASA Mar 1970 13 p refs Transl into ENGLISH from Gen Comp Endocrinol (London) v 11 1968 p 160-168

(Contract NASw-1694)

(NASA-TT-F-12877) Avail CFSTI CSCL 06C

A four-step fractionation procedure yields gonadotropic and thyrotropic fractions of relatively high specific activity from rat pituitary glands. Heterothyrotropic activity appears inseparable from gonadotropic activity. This result similar to those of experiments with bovine pituitary conform with a hypothesis according to which mammalian gonadotropins are able to stimulate thyroids of teleost fishes.

Author

N70-21687# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF NICKEL AND ITS COMPOUNDS

Ralph J Sullivan Sep 1969 76 p refs

(Contract PH-22-68-25)

(PB-188070) Avail CFSTI CSCL 13B

Research was reported on the effects of nickel and its compounds on air pollution. It included the effects on humans, on animals, on plants, on materials, environmental air standards, natural occurrence, production sources, environmental air concentration, abatement, economics, and methods of analysis.

Author (USGRDR)

N70-21719# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF BORON AND ITS COMPOUNDS

Norman L Durocher Sep 1969 55 p refs

(Contract PH-22-68-25)

(PB-188085) Avail CFSTI CSCL 13B

Contents: Boron and boron compounds effects on humans (boranes, boric acid, sodium borates, boron oxide, other boron compounds); Effects on animals; Effects on plants; Effects on materials; Environmental air standards; Natural occurrences; Production sources; Product sources (boron oxide, boric acid, borates, boric acid esters, refractory boron compounds, boron halides, diborane, tetraborane, pentaborane, decaborane); Environmental air concentrations; abatement; Methods of analysis.

USGRDR

N70-21736# Naval Medical Research Inst Bethesda Md
THEORETICAL THERMAL REQUIREMENTS FOR THE MARK 2 DIVING SYSTEM

John F Tauber, John S P Rawlins, and Kenneth R Bondi 13 Aug 1969 47 p refs

(AD-694013 Rept-2) Avail CFSTI CSCL 6/17

Theoretical heating requirements for the maintenance of thermal balance in a diver at depth and the personnel transfer capsule of the Mark 2 deep dive system are considered. The effects of radiation, conduction, forced and natural convection, metabolic heat generation, and respiratory heat loss are considered and heat replacement requirements for various configurations of diver garments are presented as functions of ambient pressure, temperature, and PTC operating conditions. Thermal requirements for heating the PTC itself are also considered.

Author (TAB)

N70-21740# Naval Air Development Center Johnsville Pa Aerospace Medical Research Dept

PSYCHOPHYSICAL METHODOLOGY 4 PHI GAMMA HYPOTHESIS AND THE METHOD OF LIMITS

Robert M Herrick 8 Sep 1969 26 p refs

(AD-694011 NADC-MR-6911) Avail CFSTI CSCL 5/10

Assuming the phi-gamma hypothesis, deductions concerning the Method of Limits (ML) are derived on the basis of a probability model. For a given step size, the selection of the initial stimulus for the ascending series, or for the descending series, has little effect on the summary statistical measures of the ML. Estimates of ML statistics are derived for different step sizes, and these estimates are used to estimate the mean and standard deviation of the phi-gamma hypothesis. Also considered are how summary statistical measures of the ML are influenced by extremely large and small step sizes and by the definition of a ML threshold.

Author (TAB)

N70-21747# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF RADIOACTIVE SUBSTANCES

Sidney Miner comp Sep 1969 159 p refs

(Contract PH-22-68-25)

(PB-188092) Avail CFSTI CSCL 13B

Contents: Radioactive substances; Effects on humans (types of exposure, biological effects (somatic effects, leukemia, other cancers, cataracts, effect on life span), genetic effects, acute exposure); Effects on animals; Effects on plants; Effects on materials; Environmental air standards (Maximum permissible dose (MPD), Maximum permissible concentrations (MPC), Natural occurrence (radioactive dusts, cosmic rays, combustion emissions, natural radioactivity); Production Sources (production of nuclear fuel, nuclear reactors, fuel reprocessing, nuclear power industry projections, nuclear tests); Product sources (Aerospace applications); Control of radioactive pollution (limitation of the emission of radioactive pollutants, containment, dispersal); Location of facility site; Air cleaning methods (radioactive particulates, wet collection); Radioactive gases and vapors (chemisorption and adsorption, absorption, delay in storage); Economics; Sampling methods (filters, impactors, impingers, settling trays); Quantitative methods (analysis of collected particulate samples for activity, radioactive particle size analysis, Gases (iodine, tritium, noble gases, other radioactive gases); Air quality monitoring).

USGRDR

N70-21748# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF AMMONIA

Sidney Miner comp Sep 1969 51 p refs Sponsored in part by HEW

(PB-188082) Avail CFSTI CSCL 13B

Contents: Ammonia's effects on humans; Effects on animals; Effects on plants; Effects on materials; Environmental air standards; Natural occurrence; Production sources (Haber-Bosch process, coke plants, oil refineries, metallurgical and ceramic plants, combustion processes); Product sources; Environmental air concentrations; Abatement; Economics; Methods of analysis.

USGRDR

N70-21756# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF BERYLLIUM AND ITS COMPOUNDS

Norman L Durocher, comp Sep 1969 92 p refs

(Contract PH-22-68-25)

(PB-188078) Avail CFSTI CSCL 13B

Contents: Beryllium and beryllium compounds effects on humans (Acute beryllium disease, Chronic beryllium disease, Carcinogenicity); Effects on animals; Effects on plants; Effects on materials; Environmental air standards; Natural occurrence; Production sources; Product sources (Beryllium-copper alloys, Fluorescent tubes, Rocket fuels, Coals); Environmental air

N70-21757

concentration Abatement Economics Sampling methods
Quantitative methods (Morin fluorescent method, Colorimetric
method Spectrographic method) USGRDR

N70-21757# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF MANGANESE AND ITS COMPOUNDS

Ralph J Sullivan comp Sep 1969 63 p refs

(Contract PH-22-68-25)

(PB-188079) Avail CFSTI CSCL 13B

Contents Effects on humans (Chronic manganese poisoning,
Manganic pneumonia) Effects on animals Effects on plants, Effects
on materials Environmental air standards Natural occurrences
Production sources (Iron and steel industry Coal Fuel oil) Product
sources (Dry-cell batteries Chemicals) Environmental air
concentrations Economics Methods of analysis (Sampling methods
Quantitative methods) USGRDR

N70-21758# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF ALDEHYDES

Quade R Stahl comp Sep 1969 149 p refs

(Contract PH-22-68-25)

(PB-188081) Avail CFSTI CSCL 13B

Contents Aldehydes effects on humans (Physiological effects,
Annoyance effects) Effects on animals Effects on plants, Effects
on materials Environmental air standards, Natural occurrence
Production sources (Formaldehyde manufacture Acrolein
manufacture) Product sources Other sources (Atmospheric
photochemical reactions Mobile combustion sources Stationary
combustion sources) Environmental air concentrations Abatement
Economics Methods of analysis USGRDR

N70-21759# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF ASBESTOS

Ralph J Sullivan comp and Yanis C Athanassiadis comp Sep
1969 105 p refs

(Contract PH-22-68-25)

(PB-188080) Avail CFSTI

Contents Effects on humans (Asbestosis Pleural calcification
and plaques Cancer Asbestos bodies) Effects on animals Effects
on plants Effects on materials Environmental air standards Natural
occurrence Production sources Product sources Environmental air
concentrations Abatement Economics Methods of analysis
USGRDR

N70-21762# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF ETHYLENE

Quade R Stahl Sep 1969 65 p refs

(Contract PH-22-68-25)

(PB-188069) Avail CFSTI CSCL 13B

Contents Ethylene s effects on humans Effects on animals
Effects on plants (phytotoxicity sensitivity of plants incidents of
plant damage) Effects on materials, Environmental air standards
Natural occurrence, Production sources (pyrolytic processes)
Product sources Other sources (automobile and diesel emissions
incinerator effluents burning of agricultural wastes) Environmental
air concentrations Abatement Economics Methods of analysis
USGRDR

N70-21763# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF HYDROGEN SULFIDE

Sydney Miner Sep 1969 107 p refs

(Contract PH-22-68-25)

(PB-188068) Avail CFSTI CSCL 13B

Contents Hydrogen sulfide s effects on humans (odor threshold
pollution occurrences) Effects on animals Effects on plants Effects
on materials (effects on paint effects on metals) Environmental
air standards, Natural occurrence Production sources (petroleum
industry petrochemical plant complexes Kraft mills coke ovens
mining iron-steel industry and foundries chemical industry animal
processing plants and tanneries) Product sources Other sources
(combustion processes polluted water well water sewage plants
and sewers) Environmental air concentration Abatement (Kraft
paper mills petroleum industry and petrochemical plants coke-oven
plants and chemical plants coal piles tanneries sewers and
sewage plants) Economics Methods of analysis USGRDR

N70-21791# Litton Systems Inc Bethesda Md Environmental
Systems Div

AIR POLLUTION ASPECTS OF CHROMIUM AND ITS COMPOUNDS

Ralph J Sullivan comp Sep 1969 86 p refs

(Contract PH-22-68-25)

(PB-188075) Avail CFSTI CSCL 13B

Air pollution from hexavalent and trivalent compounds of
chromium is discussed Inhalation of chromium compounds can
produce cancer of the respiratory tract Exposure to airborne
chromium compounds may also produce dermatitis and ulcers on
the skin The hexavalent chromium compounds are more toxic than
the trivalent compounds The uses of chromium in the metallurgical
and chemical industries and in products employing chromate
compounds as well as its presence in cement and asbestos are
believed to be the most likely sources of atmospheric pollution
Author

N70-21808*# Translation Consultants Ltd Arlington Va
**PROBLEMS OF PHYSIOLOGICAL ADAPTATION AND
BEHAVIOR IN ECOLOGICO-PHYSIOLOGICAL STUDIES
[PROBLEMY FIZIOLOGICHESKOY ADAPTATSII I
POVEDENIYA V EKOLOGO-FIZIOLOGICHESKIKH
ISSLEDOVANIYAKH]**

A D Slonim Washington NASA Mar 1970 18 p refs Transl
into ENGLISH from Fiziol Zh SSSR (Moscow) v 55 no 8 1969
p 920-928

(Contract NASw-2038)

(NASA-TT-F-12889) Avail CFSTI CSCL 06F

A brief review is given of the current trends in published
studies concerning the physiological adaptation and behavioral
features of man and animals under conditions of polar regions,
highland and arid areas Among the topics mentioned are Soviet
studies dealing with the ecological adaptation of a total of roughly
300 species of wild and domestic animals ecologico-physiological
studies of the effects of resettlement on man investigations of the
effects of vitamins on the hibernation process studies of the
physiological aspects of wildlife and studies and theories concerning
the imprinting reflexes in animals Author

N70-21814*# Wilmot Castle Co Rochester N Y Research Labs
**THE EVALUATION AND REFINEMENT OF A
MATHEMATICAL MODEL FOR THE STATISTICAL
DETERMINATION OF INTERNAL MICROBIAL
CONTAMINATION OF SPACECRAFT MATERIALS Final
Report**

Robert P Ernst 28 Aug 1968 45 p refs

(Contract NAS1-7326)

(NASA-CR-66647) Avail CFSTI CSCL 06M

By applying simple laws of probability this report indicates
that an exposure of known geometrical surfaces to microbial
nutrients will allow the growth of discriminate colonies from the

exposed surface Furthermore simple fragmentation procedures producing particles of rather large volume may be sufficient to provide meaningful estimates of in-solid microbial levels by adding statistical considerations such as particle size and surface area distributions The data in this report indicates that the reliability and efficiency of estimating microbial in-solid levels are as good as or better than most surface contamination estimating methods

Author

N70-21823# Techtran Corp Glen Burnie, Md

THERMAL COMFORT WHILE WEARING AVIATION HELMETS, ESPECIALLY IN HELICOPTERS [OVER THERMISCH COMFORT BIJ HET DRAGEN VAN VliegHelmEn, IN HET BIJZONDER IN HELICOPTERS]

N J L van der Valk et al Washington NASA Mar 1970 12 p Transl into ENGLISH from Inst Zintuigsfysiologie RVO-TNO Rept 12F 1968 - 1969 9 p

(Contract NASw-2037)

(NASA-TT-F-12876) Avail CFSTI CSCL 06Q

Since the introduction of green aircraft helmets instead of white ones for crew members of military helicopters complaints have been heard about headaches when flying in the sun for long periods The results are given of a comparison of heat development inside white and green helmets measured during normal flights These results lead to the advice to reintroduce the white helmet

Author

N70-21835# Battelle-Northwest Richland Wash Pacific Northwest Lab

DOSIMETRY TECHNOLOGY STUDIES Annual Report, 1968

Sep 1969 69 p refs

(Contract AT(45-1)-1830)

(BNWL-1159) Avail CFSTI

The design and performance of a tissue-equivalent proportional counter for measuring neutron doses in mixed gamma-neutron fields are described, along with multifilter activation rhodium-thermoluminescent combination detector system for personnel neutron dosimetry The response of thermoluminescent dosimeters including TLD-100, TLD-200 TLD-600 TLD-700 and manganese-doped lithium tetraborate was measured as a function of incident neutron energy and shielding material using cadmium and boron-10 shields A mathematical model was developed that offers a more mathematically satisfactory description of the urinary excretion process for plutonium deposited in the lungs than have previous models Sodium-24 content in the body from the activation reaction Na-23(neutron gamma) Na-24 was measured for estimating neutron doses to five reactor personnel Results of a study to determine the prospects of estimating neutron dose to personnel by measuring activated calcium-49 are presented NSA

N70-21836# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF ZINC AND ITS COMPOUNDS

Yanis C Athanassiadis Sep 1969 90 p refs

(Contract PH-22-68-25)

(PB-188072) Avail CFSTI CSCL 13B

The effects of zinc and its compounds on air pollution are presented The research includes the effects on humans animals plants materials environmental air standards environmental air concentrations natural occurrences production sources product sources abatement economics and methods of analysis

Author (USGRDR)

N70-21861# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF PHOSPHORUS AND ITS

COMPOUNDS

Yanis C Athanassiadis Sep 1969 86 p refs

(Contract PH-22-68-25)

(PB-188073) Avail CFSTI CSCL 13B

The air pollution aspects of phosphorus and its compounds on humans is discussed Also discussed were the effects on plants materials environmental air standards natural occurrence production sources product sources environmental air concentration abatement economics methods of analysis sampling methods quantitative methods and the effects on animals

Author (USGRDR)

N70-21865# Pennsylvania Univ Philadelphia Dept of Radiology
NEW APPROACHES TO IMAGE FORMATION IN RADIOISOTOPE SCANNING Progress Report, 1 Feb - 20 Oct 1969

David E Kuhl 20 Oct 1969 7 p refs

(Contract AT(30-1)-3175)

(NYO-3175-55) Avail CFSTI

The development of new systems for extracting more information from emission imaging of patients is discussed An on site digital processing system that provides a wide and flexible range of secondary data operations direct picture display on a CRT screen and full-operator control of processing and display operations at the time of the viewing is particularly discussed The Mark 3 brain scanner is also included A list of publications and presentations that evolved from this research is included NSA

N70-21867# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF PESTICIDES Technical Report

Harold Finkelstein Sep 1969 186 p refs

(Contract PH-22-68-25)

(PB-188091) Avail CFSTI CSCL 13B

Contents Effects on humans insecticide effects and toxicities (DDT group aldrin-toxaphene group benzene hexachloride group other chlorinated hydrocarbons organophosphates) herbicide effects and toxicities fungicide effects and toxicities specific effects and case histories effects on animals effects on plants effect on materials environmental air standards natural occurrence production sources product sources environmental air concentrations abatement economics methods of analysis USGRDR

N70-21885# Federal Aviation Administration Washington D C Office of Aviation Medicine

METHODOLOGY IN THE ASSESSMENT OF COMPLEX HUMAN PERFORMANCE THE EFFECTS OF SIGNAL RATE ON MONITORING A DYNAMIC PROCESS

W Dean Chiles Cheryl Beveridge Bruni and Robert A Lewis Apr 1969 14 p refs

(AD-697943 FAA-AM-69-6) Avail CFSTI CSCL 5/10

Male subjects were tested after extensive training as two five-man crews in an experiment designed to examine the effects of signal rate on the performance of a task involving the monitoring of a dynamic process Performance was measured using three signal rates with several levels of workload induced by the simultaneous performance of different combinations of tasks involving reaction time mental arithmetic pattern discrimination and group problem solving

Author (TAB)

N70-21887# Federal Aviation Administration Washington D C Office of Aviation Medicine

CONSISTENCY OF PERFORMANCE CHANGE AND

AUTONOMIC RESPONSE AS A FUNCTION OF EXPRESSED ATTITUDE TOWARD A SPECIFIC STRESS SITUATION

David W Pearson and Richard I Thackray Apr 1969 10 p refs

(AD-697944 FAA-AM-69-7) Avail CFSTI CSCL 5/10

Aviation occupations often require the performance of tasks under stressful conditions Attempts to relate differences among individuals in performance under stress to personality variables have generally not been successful Based upon responses to a fear of shock item in an attitude questionnaire describing numerous stressful situations subjects were classified as high fear of shock or low fear of shock types Results indicate significant differences between groups in both sets of measures and support the hypothesis that attitude questionnaires may be used to predict performance and bodily responses to specific stress situations

Author (TAB)

N70-21907*# Bunker-Ramo Corp Canoga Park Calif Defense Systems Div

HUMAN PERFORMANCE PREDICTION IN MAN-MACHINE SYSTEMS PART 2 THE TEST CATALOG

Dorothy L Finley Richard W Obermayer C M Bertone David Meister and Frederick A Muckler Aug 1969 273 p refs (Contract NAS2-5038)

(NASA-CR-73427) Avail CFSTI CSCL 06B

The test catalogue was designed to provide access to sociopsychological dimension measurement information from either of two starting points These two access points (1) a test name (e g spatial orientation test) or (2) a dimension name (e g manual dexterity) and the information flow are demonstrated

Author

N70-21933# Federal Aviation Administration Washington D C Office of Aviation Medicine

PATTERNS OF PHYSIOLOGICAL ACTIVITY ACCOMPANYING PERFORMANCE ON A PERCEPTUAL-MOTOR TASK

Richard I Thackray Apr 1969 14 p refs

(AD-697945 FAA-AM-69-8) Avail CFSTI CSCL 5/10

Air traffic controllers are required to spend considerable periods of time observing radar displays Yet, information regarding physiological measures which best reflect the attentional process in complex vigilance tasks is generally lacking As an initial approach to gaining such information a number of physiological measures obtained during performance of a demanding visual-motor (tracking) task were examined in order to determine which measures best differentiated the performance periods from intertrial rest periods

Author (TAB)

N70-22007# Oak Ridge National Lab Tenn

BODY FLUIDS ANALYSES PROGRAM Progress Report, 1 Mar -31 Aug 1969

Charles D Scott comp Dec 1969 91 p refs

(PB-188130 ORNL-TM-2779) Avail CFSTI CSCL 06L

Automated high resolution analytical systems are being developed for use in the clinical laboratory At present techniques are being studied that will result in the determination of large numbers of the molecular constituents in body fluids particularly organic compounds of low molecular weight Two separate analytical systems are being investigated an analyzer for detecting and quantifying UV-absorbing constituents (UV-analyzer), and an analyzer for detecting and quantifying carbohydrates (carbohydrate analyzer), in body fluids Emphasis is now being placed on evaluating prototype systems of both types of analyzers on developing miniaturized versions of each and on identifying the molecular constituents of normal and abnormal body fluids

Author (USGRDR)

N70-22008# Boeing Scientific Research Labs Seattle Wash Information Sciences Lab

LEAST-SQUARES ESTIMATION OF RESPIRATORY SYSTEM

PARAMETERS

J S Meditch and P J Stoll Aug 1969 28 p refs (Grant PHS-HE-05819-02)

(D1-82-0891 Rept-34) Avail CFSTI

In the estimation of physiological parameters visual fitting of experimental data has the obvious drawback that a given best-fit curve is not equally satisfying to every observer In this paper an iterative weighted nonlinear least-squares method of parameter estimation is formulated It provides a systematic procedure for the reduction of physiological data and obviates the need for visual fitting which is subjective The goodness of fit is evaluated in terms of a weighted least-squares error criterion This method is applied to estimate the parameters of a portion of the human respiratory control system In particular the subsystem examined is that relating tidal volume to alveolar CO2 fraction

Author (USGRDR)

N70-22012# Sensory Systems Lab Tucson Ariz
ECHOLOCATION INVESTIGATIONS ON BATS AND HUMANS TARGET LOCALIZATION AND EVALUATION Final Report, Aug 1967 - Aug 1968

Frederic A Webster and Oliver G Brazier Sep 1969 80 p refs

(Contract F33615-67-C-1879)

(AD-697070 AMRL-TR-68-155) Avail CFSTI CSCL 6/16

A device was developed to trigger cameras and echomasking sounds in relation to variations in the pulse rates of bat signals Pursuit inhibiting effects by white noise tend to increase with the distance of noise initiation from the expected point of target capture and with increased bandwidth around the central frequencies of the signals Observations on the resolution capabilities of bats indicate a capacity to select a chosen target from other targets within a centimeter or two Pairs of target-sized objects radiated with frequency-swept ultrasonic pulses give rise to systematic variations in interference patterns as a function of separation and relative angle Though human listeners can identify only gross features when such echoes are slowed by as much as 128 times bats may be able to make real time use of specific interference features When sharp pulses are used for object localization by human listeners the pulse rates and burst lengths providing the best localizing information vary with the size range texture and configurational complexity of the objects localized Variations seen both in the pulse sequences of individual bats and in the pulse structures of different kinds of bats may reflect adaptations to different requirements and different environmental configurations

Author (TAB)

N70-22060*# National Aeronautics and Space Administration Washington D C

THEORY HELPS EXPLAIN CANCER GROWTH

21 Mar 1970 8 p

(NASA-News-Release-70-43) Avail NASA Scientific and Technical Information Division

A space scientist specializing in space radiation effects on the blockage of cell division has devised and demonstrated a theory that helps to explain the source of uncontrolled malignant growth The Cone theory proposes (1) Metabolically induced and stabilized cell surface polymer (molecular structure) alterations play the central role in malignancy (2) Those changes cause decreased surface adhesion and lowered electrical voltage levels with attendant metastasis and active proliferation (3) The lowered voltage level then feeds back to stabilize and sustain the very metabolic pathways which act to produce it Short cuts to the development of chemical countermeasures against cancer are suggested

M G J

N70-22061# Edsel B Ford Inst for Medical Research Detroit Mich Dept of Neurological and Behavioral Sciences

THE PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM

OF BIOCYBERNETICS OF THE CENTRAL NERVOUS SYSTEM, WASHINGTON, D.C., 8-9 FEBRUARY 1968 Final Report

Lorne D Proctor ed Jul 1969 469 p refs
(Contract AF-AFOSR-1250-67)

(AD-689585 AFOSR-69-1707TR) Avail CFSTI CSCL 6/4

The advance in technology since 1957 has provided many sophisticated tools to probe the central nervous system as well as data processing programs to assess the multitude of records from such probings. With this sophistication the great need for biological engineers is obvious. The proceedings set out in this volume are evidence of the vast multidisciplinary scientific communities involved. Its contents concern the cyberneticist, neurophysiologist, neurologist, biologist, physicist, mathematician, computer bioscientist, experimental psychologist, and even the speech therapist in fact any of our biological or bioengineering colleagues. Author (TAB)

N70-22071*# University of Southern Calif Los Angeles Dept of Physiology

PROPOSED CARDIOVASCULAR EXPERIMENT Progress Report, 10 Oct 1969 - 28 Feb 1970

John P Meehan 28 Feb 1970 11 p

(Contract NSR-05-018-087)

(NASA-CR-109247) Avail CFSTI CSCL 06B

An experiment is proposed and reviewed in which a short range telemetry package is implanted in the abdomen and thorax of a monkey to determine arterial blood pressure, electrocardiogram, blood flow, central venous pressure, and vascular dimensions. These parameters would be studied in relation to the total environment before, during, and immediately after any flight experience whose nature was such that changes in the cardiovascular function could be defined nor anticipated. Such data would be correlated with brain data to obtain possible meaningful relationships between central nervous system and autonomic nervous system function as revealed by the proposed cardiovascular measures could be recognized and evaluated. Also the cardiovascular pressure, flows, and dimensions obtained from the low pressure system would permit a dynamic assessment of the role of atrial filling in initiating the cardiovascular adjustments associated with weightlessness. Author

N70-22110# Institute of Nuclear Research Warsaw (Poland) Dept of Radiobiology and Health Protection

BIOCHEMICAL LESIONS INDUCED IN SUBCELLULAR STRUCTURES BY IONIZING RADIATION PART 6 THE FORMATION OF LIPID PEROXIDES IN RAT LIVER

Antoni M Danciewicz et al /in AEC Nukleonika Vol 13 No 6 1969 p 118 - 127 refs (See N70-22101 09-34)

Avail CFSTI

Lipid peroxide concentration in liver subcellular fractions of rats irradiated with a dose of 750 r of X-rays was determined by the thiobarbituric acid method 0.2 and 24 hrs after exposure. Immediately after exposure (0 time) the lipid peroxide content and the lipid peroxide formation during incubation are decreased in all preparations tested. Two hours after exposure particulate fractions (nuclear, mitochondrial, and microsomal) show an increase both in the content and in the lipid peroxide formation during incubation while the corresponding values for homogenates are still decreased in comparison to nonirradiated animals. This persisting decrease (found also 24 hrs after exposure) is caused most probably by an antioxidant factor(s) present in the soluble part of the cytoplasm. The soluble fraction shows this antioxidant property which does disappear after dialysis and seems to be even greater in the preparations obtained from animals irradiated in vivo. Author

N70-22139# Geoscience Ltd Solana Beach Calif
MEASUREMENT OF TOXIC HAZARD DUE TO FIRING THE WEAPONS OF UH-1B ARMED HELICOPTER

George L Hody Aug 1969 26 p refs

(Contract DABCO1-69-C-0247)

(AD-697765 USAARL-70-5) Avail CFSTI CSCL 6/20

The toxic exhaust products of machine guns and rockets fired from armed helicopters can create a hazard for the crew. A toxic hazard evaluation was carried out with the UH-1B armed helicopter. Special methods were used to measure rapidly changing levels of carbon monoxide in the helicopter during actual flight testing. The exposure to metallic particles was also recorded.

Author (TAB)

N70-22181# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF IRON AND ITS COMPOUNDS

Ralph J Sullivan comp Sep 1969 106 p refs

(Contract PH-22-68-25)

(PB-188088) Avail CFSTI CSCL 13B

Contents: Irons and iron compounds effects on humans (Carcinogenesis, Synergism, Nutrition, Iron pentacarbonyl), Effects on animals, Effects on plants, Effects on materials, Environmental air standards, Natural occurrence, Production sources (Iron and steel industry, Coal, Fuel oil), Product sources (Incineration, Welding, rods, Antiknock compounds), Environmental air concentrations, Abatement (Iron and steel industry), Economics, Methods of analysis. USGRDR

N70-22189# Litton Systems Inc Bethesda Md Environmental Systems Div

AIR POLLUTION ASPECTS OF ODOROUS COMPOUNDS

Ralph J Sullivan comp Sep 1969 258 p refs

(Contract PH-22-68-25)

(PB-188089) Avail CFSTI CSCL 13B

Contents: Odorous compounds effects on humans (Characteristics of odors, Physiological and psychological, Theories of olfaction), Effects on animals, Effects on plants, Effects on materials, Environmental air standards, Natural occurrence, Production sources (Petroleum industry, Petrochemical plant complexes, Chemical industry, Pulp and paper mills, Coke ovens and coal, Iron-steel industry and foundries, Food processing, Meat industry), Other sources (Diesel engine odors, Aircraft odors, Sewage), Environmental air concentrations, Abatement (Petroleum industry, Chemical industry, Pulp and paper mills, Coke ovens and coal, Diesel engine odors, Meat industry, Sewage), Economics, Methods of analysis. USGRDR

N70-22198# Naval Submarine Medical Center Groton Conn Submarine Medical Research Lab

DECOMPRESSION PATTERNS DEVELOPED BY AN INTERDEPENDENT ELECTRIC ANALOG

Gary P Todd 16 May 1969 16 p refs

(AD-697650 SMRL-580 NAVMED-MR011 01-5009 01) Avail CFSTI CSCL 6/19

A simple, inexpensive electronic analog has been developed and constructed which is based on a modification to the classical Haldane mathematical model. This analog uses a series alignment of theoretical half-time tissues rather than the usual parallel arrangement. Author (TAB)

N70-22268*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

UNDERWATER SPACE SUIT PRESSURE CONTROL REGULATOR Patent Application

Billy R Aldrich, Charles R Cooper, and John R Rasquin inventors (to NASA)

(NASA-Case-MFS-20332 US-Patent-Appl-SN-869260) Avail CFSTI CSCL 06K

A device is described for regulating the pneumatic pressure in a ventilated space suit relative to the pressure imposed on the suit when being worn by a person underwater to simulate space environment for testing and experimentation. A box unit located on the chest area of the suit comprises connections for suit air supply and return lines and carries a regulator valve that stabilizes the air pressure differential between the inside and outside of the suit. The valve and thus suit pressure is controlled by the suit occupant and the valve includes a mechanism for quickly dumping the suit pressure in case of emergency. Pressure monitoring and relief devices are also included in the box unit. NASA

N70-22278# Stanford Univ Calif Electronics Labs
A MONOLITHIC IMAGE SENSOR FOR A READING AID FOR THE BLIND Technical Report

Phillip J Salsbury Jul 1969 142 p refs Sponsored by HEW and Office of Educ
 (PB-186324 SU-SEL-69-037 TR-4828-1) Avail CFSTI CSCL 06L

A novel optical-tactile reading aid giving a blind person immediate access to virtually all printed material used by sighted people has been developed which occupies a volume approximately equal to that of an ordinary desk-size dictionary. A singular feature of this instrument is a silicon monolithic image-sensing array that serves as the retina of the reading aid. Signals from the retina are used to control an array of piezoelectric stimulators that form tactile images of printed characters. The image sensor consists of a 144-element matrix of bipolar phototransistors integrated on a silicon chip approximately 2 x 4 mm in size. The order (24 x 6) and aspect ratio (2:1) of the array are determined by the resolution and field-of-view requirements of the reading aid which in turn depend on printed-character dimensions, short-term human memory tactile-stimulator size and index-finger dimensions. A column-isolated structure maximizes the active photosensing area and a one-dimensional scanning technique minimizes spurious outputs and reduces the complexity of the total system. Author (USGRDR)

N70-22468*# Stanford Research Inst Menlo Park Calif
ANALYTICAL ULTRACENTRIFUGE SERVICES AND RESEARCH Final Report

Fu-Chuan Chao 15 Jan 1970 25 p refs
 (Contract NAS2-4021 SRI Proj BU-6289)
 (NASA-CR-73430) Avail CFSTI CSCL 06A

Biological materials were characterized using techniques of analytical ultracentrifugation and electron microscopy. The materials were *Saccharomyces cerevisiae* strain LK2G12, commercial baker's yeast, Red Star and Fleischmann *Saccharomyces lactis* strain Y14, *Thiobacillus thioautotrophicus* and *T. neapolitanus*, *Halobacterium cutirubrum*, *Micrococcus lysodeikticus*, *Proteus mirabilis* and *Pseudomonas saccharophila*. Chemical composition and physicochemical properties of the materials are tabulated and discussed with particular emphasis on the ribosomes of each organism. MHE

N70-22553# Notre Dame Univ Ind Lobund Lab
BIBLIOGRAPHY OF GERMFREE RESEARCH, 1885-1963, 1968 SUPPLEMENT

Bernard A Teah May 1969 34 p
 (Contract Nonr-1623(15))
 (AD-698828) Avail CFSTI CSCL 6/3

A bibliography of 402 references concerning germfree research for the year 1968 is presented. TAB

N70-22555# Syracuse Univ NY Dept of Electrical Engineering
INTRODUCTION TO BIOLOGICAL QUANTUM MECHANICS
 Stanford Goldman 28 Oct 1969 83 p refs

(Contract N00014-67-A-0378-0002)

(AD-698824 EE-1607-69-10T1) Avail CFSTI CSCL 6/3

There are observables and eigenstates in biology as well as in physical quantum mechanics. Furthermore, the basic principle of quantum mechanics that measurement of an observable of a physical system will find the system in an eigenstate of the observable holds for biological as well as physical observables. There are transforms domains and representations in biology as well as in physics and there is a striking correspondence between their properties. An organism struggles to maintain the coherence of its individuality throughout its body. This is a means whereby it carries out the struggle for survival and is a fundamental law of biology. The biological phenomenon of alternation of generation serves as a basis for showing that there are biological analogues of bosons and fermions. An organism acts as a boson-analogue in interactions with the environment while the fermion properties of the gametes regulate the organisms internal characteristics. DNA acts in the manner of a hologram to modulate the life activity of an organism. In the alternation of generations, the organism (somaton) acts as a boson analogue. It interacts with the environment and grows in mass and complexity, but gradually shows signs of disorganization (noise). It is the extrovert generation. The sperm and ovum (gametons) act as fermion analogues. Their generation is characterized by rejuvenation, noise reduction and growth in numbers. It is the introvert generation. Author (TAB)

N70-22631# Naval Training Device Center Orlando Fla
THE EFFECTS OF ADAPTIVE STEPPING CRITERION ON TRACKING PERFORMANCE A PRELIMINARY INVESTIGATION Technical Note

Norris R Bancroft and James S Duva Oct 1969 21 p refs
 (AD-698792 NAVTRADEVCEEN-TN-3) Avail CFSTI CSCL 5/9

The work effort constitutes a preliminary investigation of several important factors in the design and implementation of adaptive training research. Specifically, the effects of using various adaptive stepping criteria upon performance were studied. Comparisons of adaptive and non-adaptive training techniques were also made. Recommendations for a follow-on phase of this work effort have been made on the basis of the findings of this first study. Author (TAB)

N70-22689# Scientific Translation Service Ann Arbor Mich
THE STATE OF WATER IN SUBSTANCES PARTICIPATING IN PHOTOSYNTHESIS [O SOSTOYANII VODY V VESHESTVAKH, PRINIMAYUSHIKH UCHASTIE V PROTSESSE FOTOSINTEZA]

A V Karyakin et al Oct 1969 11 p refs Transl into ENGLISH from Biofizika (USSR), v 14, no 2, 1969 p 240-244
 Sponsored by AEC Prepared for ANL
 (PB-187229T, ANL-Trans-780) Avail CFSTI CSCL 06A

The energy of the stronger bond of water molecules in chlorophyll a is found to be 0.7-0.8 kcal lower than that in chlorophyll b. The energy of the hydrogen bond of water is calculated in the substances inorganic phosphates (P), adenosinediphosphate (ADP), nicotinamide-adenine-dinucleotide (NAD), nicotinamide-adenine-dinucleotide-phosphate (NADP) which participate in the process of photosynthesis and it is found that in these substances water forms stronger bonds than in chlorophyll. The compounds studied contain no nonhydrogen-bound OH groups. It is suggested that water is ready to undergo dissociation as a result of the formation of its complex of the type A H - O-H B. Author (USGRDR)

N70-22719 Kansas Univ Lawrence
ANALYSIS OF A RADIOTELEMETRY SYSTEM FOR TRACKING SMALL VERTEBRATES

Warren Karl Legler (Ph D Thesis) 1969 137 p
 Avail Univ Microfilms HC \$6.60/Microfilm \$3.00 Order No 69-21544

In order to achieve practical insights into the various problems encountered in biotelemetric studies a relatively common reptile the ornate box turtle *Terrapene ornata ornata* was studied using radio transmitters. These studies were largely devoted to tracking individual turtles carrying small low power radio transmitters and were carried out at the University of Kansas Natural History Reservation. The studies involved nine individual turtles some for as long as a year. A number of observations not involving animals were made of the propagation of radio signals over short distances in several types of terrain clear and level hilly and covered with trees and brush. Some useful observations of movement patterns and habitat preferences were made possible by the ease with which an animal carrying a radio transmitter can be found. These observations were combined with representative values of transmitter and receiver characteristics to make predictions of the useful transmission ranges of various types and sizes of biotelemetry systems. Dissert Abstr

N70-22743*# National Aeronautics and Space Administration Washington, D C

APPLICATIONS OF RESEARCH ON HUMAN DECISIONMAKING

R Mark Patton Trieve A Tanner Jr and John A Swets (Bolt Beranek and Newman, Inc) eds 1970 198 p refs Proc of a symp held at Moffett Field, Calif 31 Jan -2 Feb 1968, sponsored by NASA Ames Res Center

(NASA-SP-209) Avail SOD \$2.00 CFSTI CSCL05H

Research into the psychology of decision making included the following topics: Decision making in the manual control of aerospace vehicles; pilot performance; signal recognition as an analog to decision making in limited visibility; simulation training for flight control; decision making; controller decisions in space flight; visual and auditory signal recognition; application of decision theory to manual control; decision making in manned space flight; and models for memory. S S

N70-22775# Scientific Translation Service Ann Arbor Mich QUANTUM YIELD OF THE PHOTOREDUCTION OF CHLOROPHYLL AND RELATED COMPOUNDS [KVANTOVYI VYKHOD REAKTSII FOTOVOSSSTANOVLENIYA KHLOROFILLA I RODSTVENNYKH SOEDINENII]

I M Byteva et al Oct 1969 13 p refs Transl into ENGLISH from Biofizika (Moscow) v 14 no 3 1969 p 441-446 Sponsored by AEC Prepared for ANL

(PB-187231T, ANL-Trans-781) Avail CFSTI CSCL06A

The quantum yield of the photoreduction of chlorophyll a and its related compounds was measured in the investigation. The dependence of the quantum yield on the light intensity wavelength of light the concentration of the pigment and of the reductant was studied. The reaction was found to be a single-quantum reaction. Author (USGRDR)

N70-22797# General Dynamics Corp Groton Conn Electric Boat Div

DIVER PERFORMANCE MEASUREMENT TRANSPORTING NEUTRALLY BUOYANT OBJECTS, MANUAL MOVEMENT OF HEAVY OBJECTS Final Report, 1 Apr 1968 -31 Mar 1969

B G Andersen F L Allen and J C Lamb 14 Jul 1969 49 p refs

(Contract N00014-67-C-0447)

(AD-698310 U417-69-066) Avail CFSTI CSCL5/10

The report presents the results of the second phase in a program of diver performance measurement. The purpose of the program was to develop and apply measurement techniques to determine a free-swimming divers capacity to transport objects of varying size and weight underwater. Two experiments were

conducted during this phase of the program. The first was to measure a divers ability to swim with neutrally buoyant objects of varying size to determine the effects of increased drag on a swimmer. The second experiment consisted of an exploratory investigation of a divers ability to move heavy objects underwater for short distances. Author (TAB)

N70-22895# Baylor Univ, Houston, Tex College of Medicine

MEDICAL RADIATION INFORMATION FOR LITIGATION

Stewart C Bushong John L Cox (Houston Univ) Vincent P Collins (Rosewood General Hospital) John B Neibel (Houston Univ), and George B Murphy (U S Public Health Service) Jul 1969 402 p refs Presented at Conf held at Houston Tex 21-22 Nov 1968 Prepared in cooperation with Houston Univ (Contract PHS CPE-R-69-01)

(PB-187697, DMRE-69-3) Avail CFSTI CSCL06R

A two day conference explored the feasibility of collecting and maintaining records of medical radiation exposure for purposes of potential litigation. The first day of this conference related to medical and scientific factors involved in radiation dosages, disease responses, monitoring instrumentation and records keeping. The second day of the conference related to litigation aspects of tort and workmen's compensation liability, causal and proof problems, factors pertinent to litigants and the application of current legal doctrines to the problem. Author (USGRDR)

N70-22956# Atomic Energy Commission Research Establishment Riso (Denmark) Health Physics Dept

ENVIRONMENTAL RADIOACTIVITY IN GREENLAND IN 1968

A Aarkrog and J Lippert Jul 1969 18 p refs

(RISO-203) Avail CFSTI

Measurements of fall-out radioactivity in Greenland in 1968 are reported. Sr-90 (and Cs-137 in most instances) was determined in samples of precipitation, sea water, vegetation, animals, and drinking water. Estimates of the mean contents of Sr-90 and Cs-137 in the human diet in Greenland in 1968 are given. Author (ESRO)

N70-22970# Atomic Energy Commission Research Establishment Riso (Denmark) Health Physics Dept

ENVIRONMENTAL RADIOACTIVITY IN DENMARK IN 1968

A Aarkrog and J Lippert Jun 1969 82 p refs

(RISO-201) Avail CFSTI

Fallout radioactivity measurements are presented. Sr-90 was determined in samples from all over the country of precipitation, soil, ground water, sea water, grass, dried milk, fresh milk, grain, bread, potatoes, vegetables, fruit, total diet, drinking water, and human bone. Furthermore, Sr-90 was determined in local samples of air, rain water, grass, sea plants, fish, meat, and human milk. Cs-137 was determined in milk, grain products, potatoes, vegetables, fruit, total diet, meat, and human milk samples, and Cs-137 was measured by wholebody counting in persons from a control group at Riso. Estimates of the mean contents of radio strontium and radio cesium in the human diet are given. The gamma-background was measured regularly at locations around Riso at ten state experimental farms in an area in Sealand one in Jutland where future nuclear power plants might be located and along the shores of the Great Belt. Surveys of environmental samples from the Riso area are included. Author (ESRO)

N70-22973*# HEM Research Inc Rockville, Md

HEM RESEARCH Final Report

[1969] 41 p-

(Contract NAS9-8780)

(NASA-CR-108306) Avail CFSTI CSCL06C

Preparation and shipment data are given for frozen green monkey kidney and human embryonic kidney and lung cell stocks for the Lunar Receiving Laboratory. Ampoules of these cells were shipped under liquid and vapor phase nitrogen S S

N70-22977# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div

METHOD OF PHASE INTERVAL IN THE DIAGNOSTIC PROBLEM

M L Bykhovskii 29 Jul 1969 10 p refs Transl into ENGLISH from *Eksperim Khirurg i Anesteziologya* (USSR) v 7 no 2 1962 p 16-19

(AD-698513 FTD-HT-23-244-68) Avail CFSTI CSCL 6/5

A phase space for describing normal or pathological states of the organism was introduced previously. The points in this space describe the state of the organism and the trajectories describe the dynamics of development. Individual domains of this space represent different groups of states which are defined as different nosological forms. The author introduces the concept of a phase interval which forms the basis for the possibility of creating a logic of the diagnostic process which is distinct from the probability logic which was outlined previously. TAB

N70-23006# Comitato Nazionale per l'Energia Nucleare Rome (Italy)

**RADIO INDUCED ABERRATIONS IN CHROMOSOMES
POSSIBILITY OF USING SOME BIOLOGICAL DOSIMETERS
FOR MEASURING IONIZING RADIATIONS IN MAN
[ABERRAZIONI CROMOSOMICHE RADIO-INDOTTE
POSSIBILITA D'IMPIEGO QUALI DOSIMETRI BIOLOGICI
DELLE RADIAZIONI IONIZZANTI NELL'UOMO]**

N Vulpis and E Strambi 1969 62 p refs In ITALIAN (RT/PROT(69)20) Avail CFSTI

An important aspect of radiation pathology is the examination of chromosome aberrations after irradiation in vivo and in vitro. During recent years the development within the field of cultivation and preparation technique has made it possible to carry out chromosome studies on human cells. In fact, it is only in the last years that an increasing number of papers concerned with radiation-induced chromosome aberrations appeared. These papers are divided into two groups: chromosome studies after irradiation in vivo and irradiation in vitro. Several reports were based chiefly on studies of peripheral blood from patients given X-ray treatment for ankylosing spondylitis or malignant diseases. Chromosome aberrations appearing after diagnostic roentgen irradiation or radioactive iodine were also described. Other reports were concerned with chromosome investigations of humans who received accidental irradiation in connection with nuclear accidents. Finally chromosome aberrations appear to have been found in humans who are exposed constantly to occupational irradiation. The authors discuss the possibility of employing the dose-effect relationship established for the two-hit aberrations (dicentric and rings) as the basis of human biological dosimetry. Author

N70-23250# Atomic Energy of Canada Ltd Pinawa (Manitoba) Whiteshell Nuclear Research Establishment

SOME OBSERVATIONS ON ALGAE INVADING A CS 137 CONTAMINATED POND

Janet R Dugle and J E Guthrie Jan 1970 16 p refs

(AECL-3463) Avail CFSTI Atomic Energy of Can Ltd Chalk River \$0 50

A comparison of the species of algae found at various collection sites within two ponds, one contaminated with Cs-137 was made in October 1968. Data on pond surface and bottom temperatures, algae microfauna and taxa are presented. It is felt that these ponds provide convenient ecosystems for studying the

effects of chronic irradiation on natural aquatic communities and on the succession of such communities. Author

N70-23290*# National Aeronautics and Space Administration Washington D C

CO2 CHEMICAL, BIOCHEMICAL, AND PHYSIOLOGICAL ASPECTS

Robert E Forster (Pennsylvania Univ), John T Edsall (Harvard Univ), Arthur B Otis (Florida Univ) and F J W Roughton (Cambridge Univ) eds 1969 242 p refs Symp held at Haverford, Pa 20-21 Aug 1968

(NASA-SP-188) Avail SOD \$2 75 CFSTI CSCL 06A

Reaction kinetics of carbon dioxide with buffer systems are studied. Equilibria and velocity constants for carbamates of simple peptides and of hemoglobin are determined and the elimination of carbamate formation through blocking of terminal alpha-amino groups in hemoglobin is described. Amino acid sequences of carbonic anhydrases are being studied and used to determine enzymic carboxylation processes. Also reported is research in carbon dioxide pressure equilibration between alveolar gas and capillary blood. For individual titles see N70-23291 through N70-23317.

N70-23297*# Dundee Univ (Scotland)

KINETICS OF CARBAMINO COMPOUND FORMATION IN RED CELLS AND IN HEMOGLOBIN SOLUTIONS

J C Kernohan, F J Roughton (Cambridge Univ) In NASA Washington CO2 Chem Biochem and Physiol Aspects 1969 p 61-64 refs (See N70-23290 10-04)

Avail SOD \$2 75, CFSTI CSCL 06A

The continuous-flow rapid calorimeter has been used to measure the rates of reactions involving CO2 in bovine red cells and hemoglobin solutions. In the absence of a carbonic anhydrase inhibitor there is rapid heat evolution after CO2 solutions are mixed with a cell suspension of hemoglobin solution. In the presence of concentrations of acetazolamide sufficient to inhibit the carbonic anhydrase, less heat is evolved. In the latter case the heat evolution is solely due to the formation of hemoglobin carbamino compounds. The rate of formation of these compounds has been calculated. The rate constant for carbamino formation with deoxyhemoglobin is about twice that found for oxyhemoglobin. Some possible reasons for this difference are discussed. No significant difference is found between the rates for cell suspensions and for hemoglobin solutions measured under the same conditions. Author

N70-23311*# London Univ (England) Royal Postgraduate Medical School

ALVEOLAR-BLOOD PCO2 DIFFERENCES DURING REBREATHING

N L Jones and E J M Campbell In NASA Washington CO2 Chem Biochem and Physiol Aspects 1969 p 229-231 ref (See N70-23290 10-04)

Avail SOD \$2 75 CFSTI CSCL 06A

Confirmed are previous findings of a difference in carbon dioxide pressure between alveolar gas and blood during rebreathing at rest and on exercise under conditions of negligible net CO2 movement. The difference is slightly reduced when net movement of O2 as well as CO2 is avoided by rebreathing CO2 in N2 but remains as large as 10 mm Hg in heavy exercise. Author

N70-23312*# State Univ of New York at Buffalo

ALVEOLAR TO MIXED VENOUS PCO2 DIFFERENCE UNDER CONDITIONS OF NO GAS EXCHANGE

G H Gurtner, S H Song, and L E Farhi In NASA Washington CO2 Chem Biochem and Physiol Aspects 1969 p 233-246 refs (See N70-23290 10-04)

(Grants NIH-7-F2-HE-23 NIH-834-01A1)

Avail SOD \$2 75 CFSTI CSCL 06A

Carbon dioxide tension differences in alveolar and mixed venous and arterial values under conditions of no gas exchange were studied on dogs. Formed was a hypothesis that in biological systems local carbon dioxide tension is affected by local hydrogen(+) and HCO_3^- concentrations as well as by the carbon dioxide tension of surrounding tissues. If the concentration of H^+ increases in the vicinity of the membrane or the membrane itself an increase in the association reaction occurs and CO_2 tension becomes higher than the bulk phase of the blood. Because one H^+ ion is required to associate with each HCO_3^- ion to form a H_2CO_2 molecule it is assumed that the major source of H^+ is the dissociation of protein. G G

N70-23313*# New Jersey College of Medicine Jersey City
PERMEABILITY OF THE ALVEOLAR-CAPILLARY BARRIER TO DISSOLVED CARBON DIOXIDE AND TO BICARBONATE ION

Francis P Chinard /in NASA Washington CO_2 Chem, Biochem, and Physiol Aspects 1969 p 247-256 refs (See N70-23290 10-04)

(Contract AT(30-1)-1394 Grants PHS-HE-02492 PHS-HE-09499)
 Avail SOD\$2 75 CFSTI CSCL06A

The multiple indicator dilution technique has been applied to an investigation of the permeability of the alveolar-capillary barrier to HC-1403^- and to dissolved $\text{C-1402}(\text{CO}_2\text{diss})$ with T-1824 or Na-22 as vascular indicators and DHO or THO as indicators for the aqueous compartment. Under control conditions the outflow patterns of HCO_3^- and CO_2diss cannot be distinguished from each other, the mean transit times are equal to or larger than the mean transit times of simultaneously injected water and there is invariably prolonged tailing. Recoveries in the blood are about 95 percent for both species. These results are taken as indication of distribution of injected carbon dioxide into the gas phase and randomization of the labeled carbon dioxide among the several chemical species present. After inhibition of carbonic anhydrase by acetazolamide the curves for HCO_3^- and for CO_2diss are very close to those for the vascular indicator; the mean transit times are essentially equal to those of the vascular indicators but the recoveries of CO_2diss are less than of HCO_3^- in blood and about three times larger in expired gas. These facts are taken as evidence of restriction of HCO_3^- to a volume essentially the same as the vascular compartment in common with other anions. They indicate also that CO_2diss crosses the barrier readily. Author

N70-23314*# Pennsylvania Univ Philadelphia
SIGNIFICANCE OF CARBONIC ANHYDRASE IN LUNG TISSUE

Arthur B Du Bois /in NASA, Washington CO_2 Chem, Biochem, and Physiol Aspects 1969 p 257-259 refs (See N70-23290 10-04)

Avail SOD\$2 75, CFSTI CSCL06A

Described is the capacity of lung tissue to interact with a surge of carbon dioxide by means of a reaction requiring carbonic anhydrase to possess sufficient speed to accommodate part of the load. The alveolar carbon dioxide reservoir is diluted by inspiration and some of the carbon dioxide gas is removed with each expiration. The lung tissue is not needed to supply carbon dioxide; tissue carbon dioxide only dampens the degree of fluctuation by 10 or 20 percent. G G

N70-23315*# Pennsylvania Univ Philadelphia
INFLUENCE OF CARBONIC ANHYDRASE ACTIVITY ON THE EXCHANGE OF CO_2 ACROSS THE ALVEOLAR-CAPILLARY MEMBRANE

Richard W Hyde /in NASA Washington CO_2 Chem, Biochem, and Physiol Aspects 1969 p 261-265 refs (See N70-23290 10-04)

(Grants PHS-HE-10324 PHS-HE-4108)

Avail SOD\$2 75 CFSTI CSCL06A

The dynamics of carbon dioxide exchange between alveolar gas, pulmonary tissues, and capillary blood were studied by inspiring and breathholding of gas mixtures enriched with the stable CO_2 isotope and labeled with carbon-13. In the presence of active carbon anhydrase, blood flows determined from the rate of disappearance of acetylene and carbon dioxide were almost identical, indicating that there was little or no alveolar to end-capillary gradient for carbon dioxide. Administration of a large dose of carbonic anhydrase inhibitor produced an alveolar to end-capillary carbon dioxide gradient. G G

N70-23316*# Medizinische Forschungsanstalt der Max-Planck-Gesellschaft z F d W Goettingen (West Germany)
RATES OF CHLORIDE-BICARBONATE EXCHANGE BETWEEN RED CELLS AND PLASMA

Johannes Piper /in NASA Washington CO_2 Chem, Biochem, and Physiol Aspects 1969 p 267-273 refs (See N70-23290 10-04)

Avail SOD\$2 75, CFSTI CSCL06A

Attempts to determine the rate of processes involved in the equilibration of CO_2 between red cells and plasma are reviewed. Measurements using either a thin layer of blood or the rapid reaction technique with filtration have shown that at 37 C the processes are 90 percent complete in 0.13 to 1.1 seconds. Values estimated for pulmonary contact time vary from 0.1 to 2.0 seconds. Comparison of pulmonary contact time values derived from measurement of carbon oxide diffusion at varied oxygenation levels with the kinetics of CO_2 transfer between red cells and plasma indicate that the alveolar-capillary CO_2 exchange is probably not limited by these processes at rest but might be during exercise. Author

N70-23317*# Pennsylvania Univ Philadelphia
THE RATE OF CO_2 EQUILIBRATION BETWEEN RED CELLS AND PLASMA

Robert E Forster /in NASA Washington CO_2 Chem, Biochem, and Physiol Aspects 1969 p 275-286 refs (See N70-23290 10-04)

Avail SOD\$2 75, CFSTI CSCL06A

Permeability of the red cell membrane to carbon dioxide is the basic factor in determining the rate of exchange for the whole erythrocyte to carbon dioxide. The diffusion of the dissolved gas is apparently very rapid and should not become rate limiting in the red cell. The in vivo rate of carbon dioxide equilibration between the red cell and its ambient medium, plus associated readjustments such as the Bohr shift, depend on chemical reactions and the exchanges of molecules and ions in addition to carbon dioxide. G G

N70-23318*# Boeing Co, Seattle, Wash Aerospace Systems Div

RELEASE OF MICROORGANISMS FROM SOLIDS AFTER SIMULATED HARD LANDINGS Final Report

R L Olson and S J Fraser 26 Jan 1970 105 p Prepared for JPL

(Contract NAS7-100, JPL-952511)

(NASA-CR-109344) Avail CFSTI CSCL06M

This investigation was conducted to determine the percentage release of microorganisms from the interior of solids after hard impact. The effect of impact on microbial release and survival was investigated in each of the three test phases. During the first phase, the effect was studied by impacting internally contaminated methyl methacrylate pellets onto stainless steel. The second phase was carried out by impacting contaminated methyl methacrylate pellets into sand while in the third phase contaminated epoxy pellets were impacted onto stainless steel. The methyl methacrylate

data show the percentage of microbial release to be less than 1% at all four test velocities. An exception to this is seen in the epoxy results. The percentage of total microbial survival after impact is velocity dependent but independent of initial spore concentration. The fact that the total number of organisms surviving impact decreases as the velocity increases is of significance. This decrease in total survivors with an increase in velocity offsets an otherwise expected increase in released viable organisms as material fracturing increases with velocity. Author

N70-23347*# Agence Tunisienne de Public-Relations, Tunis
RESEARCH ON THE GEOTROPIC STIMULATION PROCESS PART 1 THE GEOTROPIC SENSITIVITY OF PLANTS [UNTERSUCHUNGEN UEBER DEN GEOTROPISCHEN REIZVORGANG TEIL 1 DIE GEOTROPISCHE EMPFINDLICHKEIT DER PFLANZEN]
 Hans Fitting Washington NASA Mar 1970 136 p refs Transl into ENGLISH from Jahrb Wiss Botan (Leipzig) v 41, 1905 p 221-330 Sponsored by NASA and NSF (NASA-TT-F-12579, TT-70-58007) Avail CFSTI CSCL 06C

A method for measuring the geotropic and heliotropic sensitivity in plants by rotating, and lowering or raising the horizontal axis of a clinostat is described. The optimum stimulation was found to be the horizontal position from the normal position of rest. The horizontal is also the position of optimum stimulation for parallelotropic plant parts. It is concluded that the geotropic threshold of difference for different positions is independent of the duration of the single stimulation but differs with different angles of deviation. F O S

N70-23380# Human Resources Research Organization
 Alexandria Va
AN ANALYSIS OF SKILL REQUIREMENTS FOR OPERATORS OF AMPHIBIOUS AIR CUSHION VEHICLES (ACVS) Technical Report
 James A Mc Knight Patrick J Butler and Richard D Behringer
 Nov 1969 61 p refs
 (Contract DAHC19-70-C-0012)
 (AD-698458 HUMRRO-TR-69-18) Avail CFSTI CSCL 5/9

The report describes the skills required in the operation of an amphibious Air Cushion Vehicle (ACV) in Army tactical and logistic missions. The research involved an analysis of the ACV characteristics operating requirements and environment and results of a simulation experiment. The analysis indicates that ACV operation is complicated by (a) an inherently slow vehicle response in certain control dimensions (b) a need for complex control coordinations in performing certain necessary maneuvers and (c) the ACVs sensitivity to various aspects of the natural and man-made environment. The ACV also poses unique requirements for navigation maintenance and collision avoidance. The simulator study showed that ACVs vary considerably in operability as a function of their control configuration and pointed to the need for further attention to the control problem in developing ACV use overland. A training program of from one to three months duration appears necessary to qualify an operator fully. Author (TAB)

N70-23410*# Honeywell Inc Minneapolis Minn Systems and Research Div
FLUIDIC TEMPERATURE CONTROL SYSTEM FOR LIQUID-COOLED SPACE SUITS
 J B Starr and G L Merrill Sep 1969 54 p refs
 (Contract NAS9-8249)
 (NASA-CR-108330 Honeywell-12128-FR1) Avail CFSTI CSCL 06K

A control system was developed that would modulate coolant temperature at the inlet of a liquid-cooled garment connected to

a spacecraft by an umbilical. This was to be accomplished without the addition of electrical or hydraulic signal lines; rather, signals were to be transmitted via already existing liquid supply and return conduits. The system developed modulates coolant temperature in response to changes in pressure drop across the liquid-cooled garment. Modulation is accomplished within a fluidic temperature controller that would be located in the spacecraft. The controller contains no moving parts and responds to pressure difference signals of less than 0.1 inch of water. The principal mode considered was manual. Automatic control was considered as an aid in maintaining an acceptable thermal state during complex work situations. Automatic as well as manual operation of the system proved successful. Author

N70-23417*# Agence Tunisienne de Public-Relations Tunis
NEW STUDIES ON THE NECESSITY OF THE DIRECTING INFLUENCE OF THE FORCE OF GRAVITY FOR DEVELOPMENT [NEUE UNTERSUCHUNGEN UEBER DIE NOTWENDIGKEIT DER RICHTENDEN WIRKUNG DER SCHWERKRAFT FUR DIE ENTWICKLUNG]
 O Schultze Washington NASA Mar 1970 6 p Transl into ENGLISH from Sitz-Ber Physik-Med Ges Zu Wuerzburg (German) no 3 1897 Sponsored by NASA and NSF (NASA-TT-F-12580 TT-70-58004) Avail CFSTI CSCL 06C

The claim that the stable state of equilibrium of the frog egg able to rotate in its membrane is absolutely necessary for the normal development is discussed, and since gravity is an indispensable factor in reaching the state of equilibrium, it is also considered an absolute necessary requirement. Experiments in which the suspension of the stable state of equilibrium led to disorders in development are mentioned. It is concluded that the general attraction of mass is a necessary force for the development of oviparous animals. F O S

N70-23422*# National Aeronautics and Space Administration
 Washington, D C
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography with Indexes
 Feb 1970 184 p refs
 (NASA-SP-7011(73)) Avail CFSTI CSCL 06E

Subject coverage concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Each entry consists of a standard citation accompanied by its abstract. Author

N70-23428*# Battelle Memorial Inst Columbus Ohio
STUDIES ON OPTIMIZATION OF TECHNIQUES FOR ENZYME INSOLUBILIZATION Final Report
 J Lynn D Emmerling and R D Falb 10 Jun 1969 63 p refs
 (Contract NAS2-4890)
 (NASA-CR-73354) Avail CFSTI CSCL 06A

The attachment of aldolase, glyceraldehyde-3-phosphate dehydrogenase and fructose-1,6-diphosphatase to insoluble polymeric matrices provided stable enzymic catalysts. Studies were performed on the solution stabilities of enzymes and on the reaction of enzymes with model compounds. Insolubilization of these enzymes and the characterization of the enzyme-polymer adducts was investigated. The effect of polar aprotic solvents, substrates and sulfhydryl protective reagents on the solution stabilities of the three enzymes was studied. Model compounds containing functional groups which would be used to attach the enzymes to polymeric matrices were reacted with the enzymes, and the effect on

enzyme activity determined. Compounds investigated were maleic anhydride benzenediazonium chloride, and potassium acetate-Woodward's reagent K adducts. Three different carrier materials, ethylene maleic anhydride p-aminobenzylcellulose and aminoethyl cellulose were used to form enzyme-polymer adducts.

Author

N70-23429* General American Transportation Corp Niles, Ill Research Div

ONE-MAN FORMALDEHYDE SYNTHESIS SYSTEM Final Report

P Budininkas and G A Remus Feb 1970 88 p
(Contract NAS2-3889)

(NASA-CR-73432) Avail CFSTI CSCL 06K

A full-scale formaldehyde synthesis system was designed for a nominal one-man capacity of 200 gm CH₂O/day. The system was fabricated and experimentally tested and from the data observed a preliminary design for a ten-man system was prepared. In normal operation carbon dioxide oxygen and hydrogen gases were fed to the one-man system, using a sodium tetraborate reaction bed with nitric oxide gas as the catalyst and formaldehyde and water were generated. These products were removed by adsorption on a bed of silica gel granules. With recycling all of the carbon dioxide was converted to formaldehyde. The system operated automatically and continuously during short duration runs and in a manner compatible with zero gravity operation.

Author

N70-23443* Texas Technological Univ Lubbock Center of Biotechnology Fatigue and Human Performance
PERFORMANCE, RECOVERY AND MAN-MACHINE EFFECTIVENESS Semiannual Progress Repor., 1 Mar -31 Aug 1969

Richard A Dudek 15 Sep 1969 36 p refs
(Contract DAAD05-69-C-0102 Proj THEMIS)

(AD-698444) Avail CFSTI CSCL 5/5

The report covers the activities of a program designed to generate basic data concerning human performance and recovery within several work systems settings under conditions of varied environments, task demands motivational levels and nutritional factors. It is desired to generate from this basic data the solution to real problems and recommended procedures for mans operation under varying conditions of the work system e.g work-facilitating period combinations for various task types duration of tasks environments etc determination of mans ability to participate in continuous military operations procedures and methods for improved team training and optimal work-rest schedules for crews of vehicles in an operational environment.

Author (TAB)

N70-23458* National Aeronautics and Space Administration Washington D C

DIURNAL RHYTHM OF FUNCTIONS IN HUMANS DURING RESTRICTED MOBILITY [O SUTOCHNOM RITME FUNKTSIY CHELOVEKA V USLOVIYAKH OGRANICHENNOY PODVIZHNOSTI]

N Ye Panferova Apr 1970 13 p refs Transl into ENGLISH from Fiziol Zh SSSR (Moscow) v 50, no 6 1964 p 741-749

(NASA-TT-F-12739) Avail CFSTI CSCL 06S

Changes in diurnal periodicity of certain functions of human muscle activity under conditions of maximum restriction are studied. It is found that under these conditions the customary diurnal rhythm of body temperature changes. The body temperature remains at one level for a long period of time and then changes abruptly. The change in diurnal fluctuations of pulse rate, breathing and blood pressure was less pronounced than the change in body temperature fluctuations.

Author

N70-23460* Federal Aviation Administration Washington D C Office of Aviation Medicine

SEAT BELT INJURIES IN IMPACT

R G Snyder W M Crosby C C Snow J W Young and P Hanson Mar 1969 25 p refs Presented at the Sesquicentennial Symp on the Prevent of Highway Injury Ann Arbor 19 -21 Apr 1967

(AD-698289, FAA-AM-69-5) Avail CFSTI CSCL 6/5

Although the seat belt has been demonstrated to provide effective reduction of injuries and fatalities in automobile accidents by preventing ejection a pattern of injuries directly attributable to impingement on the belt itself is becoming evident. This paper surveys the clinical evidence of restraint system injuries, discusses gross biomechanical mechanisms of trauma and evaluates the potential of four principal types of restraint systems in producing injuries. New results are presented comparing the lap belt diagonal three-point, and double torso restraint systems in experimental primate impacts utilizing the 6571st Aeromedical Research

Laboratory's Daisy Decelerator. The double shoulder harness (with lap belt) appears to offer the greatest protection of the systems compared while the single diagonal belt (without lap belt) has been demonstrated to be the most dangerous type in certain impact situations. A seat belt system properly installed and properly worn still offers the single best protection for the automotive occupant during an impact.

Author (TAB)

N70-23465* Agence Tunisienne de Public-Relations, Tunis
CONCERNING SEVERAL MECHANOMORPHOSES IN THE FERTILIZED FROG EGG DUE TO CENTRIFUGAL FORCE [UBER EINIGE AM BEFRUCHTETEN FROSCH EICH DURCH CENTRIFUGALKRAFT HERVORGERUFENE MECHANOMORPHOSEN]

Oscar Hertwig Washington NASA Mar 1970 10 p Transl into ENGLISH from Sitz-Ber Akad Wiss Preuss (Berlin), 1897 p 14-18 Sponsored by NASA and NSF

(NASA-TT-F-12582, TT-70-58006) Avail CFSTI CSCL 06C

The experiment in which the holoblastic frog egg was transformed into a meroblastic type is described. Freshly fertilized eggs were placed in small test tubes which were then filled with water and corked. The tubes were placed along the centrifuge at distances of 17, 24, 32 and 39 cm from the axis of rotation and whirled at 145 rpm for 24 hours. The eggs nearest the axis developed normally but the eggs farthest out were so disturbed that cleavage of cells no longer took place. The eggs at the middle distances developed up to the blastula stage which had a completely different appearance from that of a normal egg. Details on the differences are given. When allowed to develop under normal conditions after 24 or 48 hours of centrifuging the eggs developed into gastrulae and embryos were formed in which deformities were frequent. Furthermore upon centrifuging, the blastula acquire a stretched out shape and a special arrangement of cells in rows.

N E N

N70-23524* Naval Aerospace Medical Inst, Pensacola, Fla
SUSCEPTIBILITY TO ACUTE MOTION SICKNESS IN BLIND PERSONS

Ashton Graybiel 18 Feb 1970 13 p refs
(NASA Order R-93)

(NASA-CR-109411, NAMI-1100) Avail CFSTI CSCL 06S

A comparison between blind and normally sighted persons was made to investigate the role of vision in the genesis of motion sickness. A group of twelve persons selected only on the basis of their visual defects were exposed to stressful Coriolis accelerations under standardized conditions. All demonstrated differences in susceptibility to acute motion sickness that bore no relation to their rank order of visual deprivation. Insofar as comparison with a group of normal subjects was made possible, no significant differences in susceptibility were demonstrable. It was concluded that vision

is not an essential but rather a secondary etiologic factor in the genesis of motion sickness. This is not incompatible with the fact that symptoms characteristic of motion sickness may be visually induced in the absence of motion. Author

N70-23542*# Agence Tunisienne de Public-Relations, Tunis
ON THE SPECIFIC LIGHT-RELATED POSITION OF DECIDUOUS LEAVES [ZUR KENNTNISS DER FIXEN LICHTLAGE DER LAUBBLAETTER]

G Krabbe Washington NASA Mar 1970 68 p refs Transl into ENGLISH from Jahrb Wiss Botan (Leipzig) v 20 1889 p 211-260 Sponsored by NASA and NSF (NASA-TT-F-12755 TT-70-58043) Avail CFSTI CSCL 06C

Nineteenth century experiments designed to investigate the mechanisms of leaf positioning are discussed. It is felt that the phenomenon of light-related position is a function of a special heliotropic property of the leaves. From the first group of experiments it is concluded that the weight of leaves is incapable of influencing the movement of the leaves. Studies on the significance of light and geotropism for leaf movements indicate that light controls the leaf's movements, and exerts an influence on the stationary leaves. It is also concluded that the geotropic properties of Pelargonium plants are not affected by the influence of light. A last group of experiments show that the leaf surface does not control the movements of the leaf stem in Phaseolus plants and it is concluded that a force in addition to light is necessary to bring about torsion movements. N E N

N70-23543*# Agence Tunisienne de Public-Relations, Tunis
RESEARCH ON THE GEOTROPIC STIMULATION PROCESS PART 2 FURTHER RESULTS WITH INTERMITTENT STIMULATION [UNTERSUCHUNGEN UBER DEN GEOTROPISCHEN REIZVORGANG TEIL 2 WEITERE ERFOLGE MIT DER INTERMITTIERENDEN REIZGUNG]

Hans Fitting Washington NASA Mar 1970 94 p refs Transl into ENGLISH from Jahrb Wiss Botan v 41 1905 p 331-398 Sponsored by NASA and NSF (NASA-TT-F-12670 TT-70-58013) Avail CFSTI CSCL 06C

Investigations on the geotropic effect of intermittent stimulation and the geotropic presentation period with intermittent stimulation performed at the turn of the century, are discussed in detail. The fading out of geotropic excitations and the relaxation period are described and the reciprocal influences of two geotropic stimulations are studied. N E N

N70-23583# Harry Diamond Labs Washington D C
AN AIR-OXYGEN MIXING VALVE FOR VOLUME-CYCLED RESPIRATORS

James W Joyce, Jr Aug 1969 21 p refs (AD-698459 HDL-TM-69-20) Avail CFSTI CSCL 6/11

A valve that can deliver breathing gas of variable air-oxygen makeup to respirators has been designed, fabricated and tested. Test results show that gas mixtures containing 20 to 100 percent oxygen can be obtained with good reliability. The maximum change in the makeup of gas leaving the valve caused by varying test conditions was about 5 percent oxygen. Author (TAB)

N70-23600*# Texas Nuclear Corp Austin
LARGE AREA PROTON BEAMS FOR RADIOBIOLOGIC RESEARCH FROM THE NASA-SREL SYNCHROCYCLOTRON 1 INVESTIGATION OF THE NOMINAL 300-MeV PRIMARY BEAM 2 INVESTIGATION OF THE NOMINAL 600-MeV PRIMARY BEAM Final Report, Jul-Dec 1967

K R Blake L A Boles J B Nelson C V Parker Jr and C A Harris Brooks AFB Tex School of Aerospace Med Dec 1968 35 p refs Prepared for School of Aerospace Med

(NASA Order R-44 Contract F41609-67-C-0106) (NASA-CR-109372 AD-683716 SAM-TR-68-79) Avail CFSTI CSCL 06R

Measurements have been made of the characteristics of large area proton beams for radiobiologic research from the 600-MeV synchrocyclotron. Proton beams with energies ranging from 450 to 150 MeV were produced by degrading the nominal 600-MeV primary beam to the desired energy with the appropriate thickness of aluminum, copper or lead at the beam transport system exit port. Proton beams with energies ranging from 295 to 30 MeV were produced by degrading the nominal 300-MeV beam from the synchrocyclotron. In addition the primary beams were expanded with the quadrupole magnets of the beam transport system and the characteristics of these beams were investigated. The maximum proton flux and spatial distribution of the flux of the various beam configurations were measured at distances of 5, 10 and 15 feet from the exit port and the corresponding dose rates in tissue were calculated from the maximum flux values. The intensity profiles of the degraded beams were found to be approximately Gaussian and measurements of several such profiles indicated that the beams were approximately circular. The profile widths and dose rates were measured for many different configurations. Author

N70-23612# Northwestern Univ Evanston, Ill Dept of Biological Sciences

CHEMICAL RANGING AND TRACKING Final Report, 27 Dec 1967-30 Jan 1969

Robert C Gesteland Jul 1969 57 p refs (Contract DA-ARO(D)-31-124-G991) (AD-698581) Avail CFSTI CSCL 6/2

The vertebrate nose is unrivaled in its sensitivity to a wide range of trace chemical substances occurring in air and water. At present there are no useful, broad spectrum instruments suitable for real time-chemical detection and analysis. Significant advances in understanding the chemical basis of the olfactory receptor membrane and in relating the signalling parameters of nervous activity to receptor stimulation were made during the period of this grant. In addition a comparative histological study turned up a vertebrate nose with very large receptor cells, which should allow one to monitor cell function with intracellular microelectrodes for the first time. Finally several methods were developed for using an electrochemical cell as an indicator of the presence of trace contaminants in a flowing stream. Author (TAB)

N70-23662# Joint Publications Research Service Washington D C

CHROMOSOME MUTATIONS INDUCED BY SPACEFLIGHT FACTORS IN BARLEY SEEDS DURING THE CIRCULUNAR FLIGHTS OF THE AUTOMATIC STATIONS ZOND 5 AND ZOND 6

N I Nuzhdin et al 4 Mar 1970 17 p refs Transl into ENGLISH from Zh Obshchey Biol (Moscow) no 1 Jan-Feb 1970 p 72-83 (JPRS-49979) Avail CFSTI

The results of a cytological study of the material carried around the moon showed that spaceflight factors induce chromosome mutations. The effect of spaceflight factors combined with gamma radiation varies with the physiological state of the material and radiation dose. Under some conditions the effect of two factors is additive while under others irradiation increases the impact of spaceflight factors. Author

N70-23664# Commissariat a l'Energie Atomique Bruyeres-le-Chatel (France)

RADIOCHROMATOGRAPHIC DETERMINATION OF PLASMATIC ADENOSINE DEAMINASE (AD) [DETERMINATION RADIOCHROMATOGRAPHIQUE DE L'ADENOSINE DEAMINASE (AD) PLASMATIQUE]

Jean-Jacques Chivot Dany Depernet and Jacques Caen (Inst de Rech Sur Les Maladies du Sang Paris France) Jan 1970 19 p refs In FRENCH ENGLISH summary (CEA-R-3838) Avail CFSTI

An adenosine deaminase activity in normal human heparinized platelet-poor plasma which can degrade 0.16 micromole adenosine was measured using a radiochromatographic method. This activity which is suppressed by heating at 56 deg C for 30 minutes, reduced by conservation at -20 deg C after one week and inhibited by high concentrations of urea is not affected by dipyrindamol and p-hydromercurylbenzoate. The activity is proportional to the quantity of plasma, which is the source of the enzyme but in the different reactive systems. Author (ESRO)

N70-23668# Technische Univ Berlin (West Germany) Inst fuer Flugfuehrung und Luftverkehr

STABILIZATION AND GUIDANCE OF VEHICLES USING PREDICTION METHODS [STABILISIERUNG UND LENKUNG VON FAHRZEUGEN MIT HILFE DER VORANZEIGE]

D Dey and G Johannsen Sep 1969 127 p refs In GERMAN (Rept-50) Avail CFSTI

Man and machine e.g. an aircraft, form a closed control loop. The transfer function of such systems can be improved if the pilot not only knows the momentary value of the regulatory magnitude but also the expected value. The extrapolation into the future can be done with the aid of a Taylor's service. The influence of the prediction under different conditions was measured to obtain quantitative indications of the attained improvement of the control quality. The necessary evaluation of a prediction was studied systematically. The results of these considerations are also applicable to other control problems. Finally experiments were performed to measure the psychological stress on the human controller. ESRO

N70-23670# Technische Hochschule Darmstadt (West Germany) Inst fuer Meteorologie

ERRORS IN COMPUTING THE DISPERSION OF ATMOSPHERIC TRACE ELEMENTS. A CRITICAL COMPARISON OF MEASURED AND CALCULATED SULFUR DIOXIDE CONCENTRATIONS [DIE FEHLER BEI DER RECHNERISCHEN ERFASSUNG DER AUSBREITUNG ATMOSPHAERISCHER SPURENSTOFFE EIN KRITISCHER VERGLEICH GEMESSENER UND BERECHNETER SO₂ SUB 2 KONZENTRATIONEN]

G Manier Jan 1969 32 p refs In GERMAN Sponsored by Hess Min fuer Wirtsch und Verkehr Avail CFSTI

The reliability of calculated concentrations often arises in work on the dispersion of trace elements. Consequently a comparison was made between about 2000 measurements of the SO₂-concentration near a sulfuric acid factory and the calculated concentrations. The agreement was not satisfactory and the reasons are discussed. ESRO

N70-23676*# Miami Valley Hospital Dayton Ohio
FUNCTIONAL VERIFICATION OF THE APOLLO URINE TRANSPORT SYSTEM

Bernard J Katchman and James P F Murphy Wright-Patterson AFB Ohio AMRL Feb 1969 40 p refs (NASA Order R-85 Contract AF 33(657)-11716) (NASA-CR-109331, AD-687148 AMRL-TR-67-166) Avail CFSTI CSCL 06S

A simulated aerospace study was conducted to assess the biochemical effects of space flight by determining the volume of urine output of each crewman. The Apollo urine transport system (UTS) using a radioisotope, tritium dilution technique was tested by four human male subjects. The Apollo UTS met minimum requirements for 14 days even when a single unit was used by four

individuals. The best individual performance by a subject gave a ratio of 101.4 plus or minus 4.6%. The overall value for volume measurement from the four subjects was 100.6 plus or minus 4.6%. Any void volume may be calculated by this radioisotope method with the UTS system plus or minus 10% of its volume at the 95% confidence level. One experimental error was the incomplete mixing of the radioisotope. The practicability of this procedure in actual space missions still has to be determined. Author (TAB)

N70-23725*# General Electric Co Philadelphia Pa
A STUDY OF ASEPTIC MAINTENANCE BY PRESSURIZATION

Donald J Cheater Robert J Homsey Maurice E Long and John F Sontowski [1969] 186 p refs (Contract NAS1-9174) (NASA-CR-66908) Avail CFSTI CSCL 06C

A study of aseptic maintenance by pressurization has been conducted. It has been demonstrated that a pressure differential slightly above ambient across a membrane separating two quiescent gas chambers prevents migration of microorganisms through a single microscopic hole against that pressure gradient. Spores of *B. subtilis* var. *niger* were aerosolized into a chamber and were presented by gravity to the hole at the bottom of the chamber. The holes ranging in size from 19 microns to 1887 microns in diameter were made in 0.12 inch thick membranes of aluminum. The viable spores which penetrated the hole were captured on an agar medium. A total of 50 tests with pressure differentials ranging from 0.5 inches to 2.0 inches of water resulted in total exclusion of micro-organisms from the detection medium. Author

N70-23744# Joint Publications Research Service Washington D C
RADIO AND ECOLOGY

Mark Chervyakov et al 11 Mar 1970 28 p Transl into ENGLISH of the book Radio i Ekologiya Moscow Znaniye 1969 p 1-32 (JPRS-50043) Avail CFSTI

The principles of building equipment and developing methods for radio and hydroacoustical animal tracking are studied. It is shown that if the location of the animal is determined by direction finding only a transmitter is required for the animal installation, when measurement of the distance to the animal is necessary, a responder is required as the autonomous installation. For tracking fish an ultrasonic band of frequencies from 20 to 300 kHz is considered desirable. Below these frequencies the use of large transmission equipment affects the animals and above this frequency there is a strong dampening effect by the water. It is concluded that Ecotelemetry offers information in ecology and bionics to track migratory animals such as the whale. F O S

N70-23750# Aztec School of Languages Inc Maynard Mass
Research Translation Div

A SINGLE NUMERICAL CHARACTERISTIC OF THE QUALITY OF DIAGNOSES [YEDINAYA CHISLOVAYA KHARAKTERISTIKA KACHESTRA DIAGNOZOV]

V V Alpatov Jan 1970 9 p refs Transl into ENGLISH from Sov Zdravookhr (Moscow), v 22 1963 p 38-41 Prepared for Lincoln Lab MIT (AZT-70-43-RULL) Avail CFSTI

The use of a correlation coefficient and an index of false diagnoses as single numerical characteristics is proposed to evaluate the quality of disease diagnosis. Author

N70-23751*# Illinois Univ Urbana Biological Computer Lab
A NEW HOMEOSTAT

Michael G Wilkins 15 Jun 1968 29 p refs

(Grant NGR-14-005-111, Contract AF 33(615)-3890, Grant AF-AFOSR-7-67)
(NASA-CR-109376, AD-683048, AFOSR-69-0316TR, BCL-8-3)
Avail CFSTI CSCL 6/4

The concept of homeostasis and its relations to control and regulation is briefly discussed and the ideas leading to the concept of the ultrastable hierarchic controller are sketched. Previous electronic realizations of homeostatic controllers are discussed and a new homeostat is described briefly. The machine presently under construction has a number of new and useful features and these are described together with experiments to be performed when the machine is complete. Author (TAB)

N70-23761# Naval Submarine Medical Center Groton Conn
Submarine Medical Research Lab

SOME COMPARISONS BETWEEN VISUAL AND AUDITORY NEUROPHYSIOLOGY

J Donald Harris and Russell L Sergeant 2 Sep 1969 15 p refs
(AD-697952 SMRL-592) Avail CFSTI CSCL 6/16

A number of concepts and facts from the vision domain are of interest and value to otologists. Not only the similarities but also the differences between the two sensory systems are enlightening. The paper discusses the similar ranges of sensitivity to quanta of energy and the biological mechanisms whereby the physical stimuli are transformed logarithmically, coding of the physical stimulus by single cells in the optic and the auditory nerves, principles of neural integration in the brainstem and midbrain nuclei, the point-to-point relationship between cortical activity and certain aspects of the physical stimulus, the eye and ear as channels of information, and cross-modality facilitation and inhibition. Author (TAB)

N70-23784# Federal Aviation Administration Washington D C
Office of Aviation Medicine

TIME-ZONE EFFECTS ON THE LONG DISTANCE AIR TRAVELER

P V Siegel, Siegfried J Gerathewohl and Stanley R Mohler Sep 1969 13 p refs
(FAA-AM-69-17) Avail CFSTI

Findings are presented on the consequences of rapidly crossing numerous time zones such as occurs in present-day jet aircraft travel. Conclusions reached by FAA researchers and scientists of other laboratories are included, together with recommendations for overcoming time-zone fatigue. These recommendations are for use by the individual long distance traveler. A practical formula is given which describes how one may compute the rest period following a long distance trip. This period is to enable the biological rhythms to rephase in order that the traveler will be in proper physical and mental condition to pursue his responsibilities. Author

N70-23855# Joint Publications Research Service, Washington, D C

NEW DATA ON THE STEREOSCOPIC FIELD OF VISION OF HEALTHY INDIVIDUALS

B A Tremeyt 13 Mar 1970 6 p Transl into ENGLISH from Vestn Akad Nauk Kaz SSR (ALMA-ATA) v 25 Jul 1969 p 68-71
(JPRS-50068) Avail CFSTI

Developed was an instrument for stereoscopic examination of the human field of vision that measures meridians and parallels of the visual functions. Photoc sensitivities were determined statistically for the points of fixation and combined with the indices of meridians and parallels to construct visual field diagrams. Strong age related differences in normal stereoscopic fields of vision were again confirmed. G G

N70-23884# Joint Publications Research Service Washington D C

SOME PROBLEMS OF NEUROBIONICS

K O Ivanov-Muromsky 12 Feb 1970 12 p Transl into ENGLISH from Visnik Akad Nauk Ukrayns koy RSR (Kiev) no 7 1969 p 72-78
(JPRS-49811) Avail CFSTI

The initial steps in the field of neurobionics such as creation of artificial neurons, synthesis of neuron networks and their application to the problem of pattern recognition are briefly reviewed. Both Soviet and foreign efforts in controlling physical systems by brain waves are surveyed. A model of human decision making is described and applications of the model to computer-aided prognosis of diseases are presented. R B

N70-23888# Wisconsin Univ Madison Food Research Inst
BIOCIDAL EFFECTS OF SILVER Final Technical Report

Dean O Cliver, William B Sables, Wesley K Foell and John M Goepfert Feb 1970 30 p

(Contract NAS9-9300)

(NASA-CR-108338) Avail CFSTI CSCL 06T

An investigation to determine if silver ions can kill or inactivate microbial and viral agents in very pure water is reported. The results are to be applied in the design of future spacecraft water systems. Salts of silver were employed in many of these experiments but silver ions generated by an electrolytic apparatus were used when possible. Silver was assayed by neutron activation analysis. Bacteria employed as experimental models were selected on the basis of tests of previous spacecraft water systems. Viruses were chosen simply to represent a broad variety of agents. Author

N70-23897# Aircraft Porous Media Inc Glen Cove N Y
[MICROBIAL CONTAMINATION IN SPACECRAFT WATER SYSTEM] Final Report

9 Mar 1970 22 p refs

(Contract NAS9-9027)

(NASA-CR-108336 H-1360-2) Avail CFSTI CSCL 06K

A study was conducted to determine the degree of microbial back contamination to be expected from the waste water to the potable water in the Apollo Command Module water system. The study shows that a bacteria removal filter is needed immediately upstream of the potable water tank or immediately upstream of the potable water outlet. Author

IAA ENTRIES

A70-22001 * Hypothalamic stimulus effects on sympathetic nerve activity I Ninomiya, W V Judy, and M F Wilson (West Virginia University, Morgantown, W Va) *American Journal of Physiology*, vol 218, Feb 1970, p 453-462 29 refs NIH Grant No HE 10234 04, Grant No NGL-49 001 001

Analysis of hypothalamic stimulus effects on sympathetic nerve activity (SNA) to heart, spleen, kidney, and leg skeletal muscle in anesthetized cats The magnitude and time course of SNA during stimulation varied with stimulus area, stimulus frequency, combinations of areas stimulated and baroreceptor reflex effects A possible model of the system is discussed M V E

A70-22075 # Retinal-temperature increases produced by intense light sources M A Mainster, T J White, J H Tips, and P W Wilson (Technology, Inc, San Antonio, Tex) *Optical Society of America, Journal*, vol 60, Feb 1970, p 264-270 6 refs DASA supported research Contract No AF 41(609) 68-C 0023

The heat-conduction equation is used to describe retinal temperature increases produced by the absorption of intense light in the retina and the choroid Temporal, radial, and axial temperature distributions are presented for both continuous and pulsed light sources operating at 700 nm A point spread distribution of retinal irradiance is considered in addition to a wide range of uniform and gaussian distributions The application of computed temperatures to the prediction of retinal damage is discussed in terms of a maximum temperature-damage criterion, and dependence of these predictions upon the depth of the retinal pigment epithelium is detailed

(Author)

A70-22080 # Physicochemical methods of producing formaldehyde for carbohydrate synthesis in life-support systems (Fiziko-khimicheskie metody polucheniia formal'degida dlia sinteza uglevodov v sistemakh zhizneobespecheniia) M A Lobanova and Iu E Siniak *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 11-20 25 refs In Russian

Brief review of the literature covering physicochemical methods of synthesizing formaldehyde Procedures of formaldehyde synthesis under ground-based conditions have been developed at different degrees, therefore, it is difficult to give preference to any of them on the basis of weight or power characteristics However, high priority should be given to the following methods of the formaldehyde synthesis from CO and hydrogen under the influence of electric discharges, from methanol obtained through the synthesis of carbon dioxide and hydrogen, from methanol obtained through methane chlorination, and by methane oxidation in the presence of nitrogen oxides (Author)

A70-22081 # The influence of synthetic carbohydrates on the growth and toxin formation of type A Cl perfringens (Vliianie sinteticheskikh uglevodov na rost i toksinobrazovanie Cl perfringens tipa A) G F Shermanova *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 21-24 9 refs In Russian

Investigation of the effect of synthetic carbohydrates on the growth and toxin formation of type A Cl perfringens The observed growth rate of bacterial mass and the amounts of protein eliminated into the ambient liquid indicate that synthetic carbohydrates cause an insignificant inhibition of the life processes M V E

A70-22082 # Effect of a changed atmosphere on the low temperature tolerance (Vliianie izmenenii gazovoi sredy na

ustoichivost' organizma k nizkim temperaturam) I P Shcherbachev *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 29-32 9 refs In Russian

A 4 hour exposure of white mice to atmospheres with an increased content of carbon dioxide (5-7%), oxygen (35-40%) or both gases brought about a decrease of their rectal temperature Carbon dioxide produced the highest hypothermal effect while oxygen induced the lowest During the subsequent exposure to low temperatures (-25 and -50 deg C), the animals pre-exposed to a hypercapnic atmosphere showed the lowest rate of the rectal temperature decrease and their death occurred at lower rectal temperatures as compared to control animals It is suggested that increased carbon dioxide concentrations in the atmosphere may elevate the tolerance of mice to low temperatures (Author)

A70-22083 # The proliferative activity of the bone marrow of dogs upon their chronic gamma-irradiation (Sostoianie proliferativnoi aktivnosti kostnogo mozga sobak pri khronicheskom gamma-obluchenii) T M Zukhbaia *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 32-35 8 refs In Russian

The mitotic activity and chromosome aberrations in the bone marrow of dogs exposed to a chronic gamma-irradiation at doses of 25, 75 and 150 r per year were studied No noticeable changes in the proliferative activity were found An increase of chromosome aberrations was seen in the animals irradiated with doses of 75 and 150 r/year (Author)

A70-22084 # Effect of various decompression rates on the altitude tolerance of rats (Vliianie razlichnykh skorosti dekompressii na vysotnuu ustoichivost' krysa) A V Sergienko *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 36-41 9 refs In Russian

Experimental study of the effect of various decompression rates on the altitude tolerance of white rats in a pressure chamber A distinct relationship between the decompression rates and changes in the animal tolerance to acute hypoxia is noted It is concluded that the decompression rate is of independent biological significance in hypoxia tolerance with an increase in the decompression rate the altitude ceiling increases and the period of maintained activity progressively decreases In the case of slowly increasing hypoxia the basic effect is on the cardiovascular respiratory, circulatory, and thermal control systems while in the case of rapidly increasing hypoxia the main influence is on the central nervous system A B K

A70-22086 # Basic principles of the development of schedules of acceleration training (Ob osnovnykh printsipakh postroeniia skhem trenirovochnykh vrashchenii na tsentrifuge) V I Stepanov and A V Eremin *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 47-54 8 refs In Russian

Experiments were performed with 37 animals (dogs) and 22 test subjects In animal experiments the efficiency of three schedules was evaluated as judged by variations in maximally tolerable accelerations as well as by physiological, morphological and histochemical changes in the body In human experiments the efficiency of two schedules was assessed The schedules differed in the number of rotations, intervals between them and level of the accomplishment of the main principles of training Our studies have resulted in the development of basic requirements that should underlie rational schedules of training of animals and humans in order to increase their tolerance to transverse accelerations (Author)

A70-22087 # Effect of the diet containing destroyed cells of unicellular algae on the enteric microflora composition (Vliianie diety, soderzhashchei razrushennye kletki vodoroslei, na sostav kishchnoi mikroflory) V M Shilov, N N Liz'ko, V I Fofanov, and N S Klushkina *Kosmicheskaiia Biologiia i Meditsina*, vol 3, Nov-Dec 1969, p 54-57 In Russian

The paper surveys the studies of the enteric microflora of animals and human beings who were fed with diets containing different protein sources. In animals the casein-containing diet resulted in a decrease of the concentration of lactobacilli while the diet containing proteins of unicellular algae led to an increase of the amount of spore-forming anaerobic bacteria. These changes may be associated with the protein properties. In men the diets containing proteins of unicellular algae produced a decrease of the concentration of bifidobacteria and lactobacilli. Our results show that large quantities of the biomass obtained through the current method of treatment cannot be recommended for human nutrition. Further studies should be aimed at developing improved methods to separate the substance of unicellular algae and, consequently, to produce readily assimilated protein products. (Author)

A70-22088 # Space diets for one-month flights (Ratsion pitaniia dlia ekipazhei kosmicheskikh korablei s prodolzhitel'nost'iu poleta do mesiatsa). V. P. Bychkov and P. P. Ivanov. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 58-62. In Russian.

Testing of space diets demonstrated that in the environments with energy costs of 34 Cal/kg of body weight the mean daily requirements of man for nutrients and water, as calculated per the assimilable portion, were proteins—15 g, fats—12 g, carbohydrates—41 g and water—28 g per kg of body weight. Our investigations showed that metabolic parameters varied within the limits that induced no abnormalities in the health condition of the test subjects. (Author)

A70-22089 # Effect of electrostimulation of lower limb muscles on an increase of orthostatic tolerance (Znachenie elektrostimulyatsii myshts nizhnikh konechnostei v povyshenii ortostaticheskoi ustoychivosti). B. B. Egorov, V. S. Georgievskii, V. M. Mikhailov, V. I. Kir, I. P. Semeniutin, E. K. Kazimirov, Iu. V. Davidenko, and L. I. Fat'yanova. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 62-65. 9 refs. In Russian.

The cardiovascular reaction of 9 healthy male test subjects to a passive orthostatic test was studied. Every test subject was exposed to the test twice: a control test and a test accompanied by the muscle electrostimulation. The application of controlled muscular contractions increased the orthostatic tolerance which was confirmed by subjective feelings of the subjects and by an objective decrease of the absolute value of the heart rate and by an increment of the pulse rate in the erect position. (Author)

A70-22090 # Alveolar ventilation and pulmonary circulation during the application of a negative pressure to the lower part of the body (Al'veoliarnaya ventilatsiya i legochnyy krovotok pri deistvii otritsatel'nogo davleniya na nizhnuyu chast' tela). A. M. Genin, V. G. Voloshin, V. I. Sokolov, and M. A. Tikhonov. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 66-70. 14 refs. In Russian.

Results of experiments performed on 11 healthy male test subjects within the age range from 21 to 40 years, who were exposed to lower-body negative pressure (to -80 mm Hg). According to their physiological reactions, the test subjects were divided into those resistant and nonresistant to the exposure. Due to the pooling of a portion of the circulating blood in the lower body and a decrease in the venous return, the arterioalveolar difference in carbon dioxide partial pressure increased, the physiological and alveolar dead space increased, and the number of ventilated but nonperfused alveoli rose. These changes were more pronounced in the test subjects who appeared nonresistant to the lower-body negative pressure. The study of the alveolar carbon dioxide partial pressure dynamics may be of prognostic significance in evaluating the health state of test subjects. The progressive reduction of the alveolar carbon dioxide partial pressure is indicative of increasing circulatory disturbances. (Author)

A70-22091 # A method of chronic monitoring of the bioelectric activity of the anterior and posterior roots of the canine spinal cord (K metodike khronicheskogo otdeniia bioelektricheskoi aktivnosti perednikh i zadnikh koreshkov spinnogo mozga sobaki). S. A. Skuratova and V. S. Oganov. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 71-73. 10 refs. In Russian.

Development of a method of chronic implantation of electrodes in the anterior and posterior roots of the spinal cords of dogs for the purpose of recording the bioelectric activity under various conditions of operation of the sensomotor apparatus. The proposed method is recommended for use in prolonged chronic experiments on dogs with restricted motor activity and in other model experiments. The interelectrode resistance on one and the same pair of operating electrodes after a period of up to four months is found to remain essentially unchanged, while the resistance on different pairs of electrodes amounts to 20 to 100 kohms. A. B. K.

A70-22092 # Dynamics of the elimination of 5-oxyindoleacetic acid in rats during prolonged hypokinesia (Dinamika vyvedeniia 5-oksinolouksusnoi kisloty u krys pri dritel'noi gipokinezii). Z. S. Dolgun and S. P. Novikova. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 74, 75. In Russian.

Study of the effect of prolonged motor activity restriction on the dynamics of elimination of 5 oxyindoleacetic acid in rat urine. On the basis of experiments with rats in so-called 'hypokinetic' cages, it is found that during hypokinesia the dynamics of elimination of 5 oxyindoleacetic acid undergo changes indicating the occurrence of certain shifts in the serotonin metabolism. A. B. K.

A70-22093 # Effect of hypokinesia on conditioned reflex activity of white rats (Vlianie gipokinezii na uslovnoreflektornuiu deiatel'nost' belykh krys). L. N. Khruleva. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 75, 76. 6 refs. In Russian.

Study of the state of the higher central nervous system of white rats during a 30-day period of hypokinesia followed by a period in which aftereffects were manifested. On the basis of an analysis of the data obtained from this study, it is shown that a 30 day period of hypokinesia causes considerable shifts in the organism, which indicate the disruption of vitally important functions and require a long time for recovery. A. B. K.

A70-22094 # Effect of brief exposure to a hypercapnic atmosphere on the human organism (Vlianie na organizm cheloveka kratkovremennogo prebyvaniia v atmosfere s povyshennym soderzhaniiem uglekisloty). V. S. Moskalenko. *Kosmicheskaya Biologiya i Meditsina*, vol. 3, Nov-Dec 1969, p. 77, 78. In Russian.

Study of the effect of a two-hour exposure to an above normal concentration of carbon dioxide on the organism of a man performing light physical labor. On the basis of the results obtained from this study, it is concluded that a two hour exposure to a gas mixture containing up to 4% carbon dioxide is entirely tolerable to a healthy man in a state of rest or performing light labor. A. B. K.

A70-22204 Domestic literature on aviological, high-altitude, and space biology and medicine. Bibliography (Otechestvennaya literatura po aviatsionnoi, vysokogornoi, i kosmicheskoi biologii i meditsine. Bibliografiia). A. A. Sergeev. Leningrad, Izdatel'stvo Nauka, 1969. 191 p. In Russian.

Bibliography of Russian literature published between 1865 and 1967 and dealing with specific problems in aerospace and high altitude biology and medicine. The work contains 5253 entries arranged alphabetically by authors' names, literature of a general nature is not included. Cross references by contents are provided since each entry is numbered. Subject reference headings include the duties of flight crew, air sickness, vibration, pilot training, effects

of hypoxia on different body systems, effects of excessive oxygen pressure, use of pharmacological media, studies on satellites, weightlessness, orientation in flight, radiobiology, medical telemetry, thermal regulation, toxicology, hygiene, accelerations, sensory analyzers, and physical fitness T M

A70-22206 * # Temperature-sensitive mutants of *Bacillus subtilis* I—Multiforked replication and sequential transfer of DNA by a temperature-sensitive mutant Hiroshi Yoshikawa (California, University, Berkeley, Calif.) *National Academy of Sciences, Proceedings*, vol 65, Jan 1970, p 206-213 21 refs Research supported by the American Cancer Society, Grant No NGR-05-003-020

A temperature-sensitive mutant of *Bacillus subtilis* 168 was isolated Its chromosome was found to undergo multiforked replication at normal temperature The mutant cells then transferred chromosomes to recipient cells sequentially from the origin to the terminus of the chromosome at sublethal temperatures Sequential transfer of the chromosome facilitated the determination of the relative positions of markers on the chromosome Linkage between origin (adenine-16) and terminus (methionine) was demonstrated

(Author)

A70-22209 Fluttering of the mitral valve in aortic insufficiency Fred Winsberg, George E Gabor (Lincoln Hospital, Bronx, N Y), Joseph G Hernberg (Albert Einstein College of Medicine, Bronx, N Y), and Barry Weiss (New York University, New York, N Y) *Circulation*, vol 41, Feb 1970, p 225-229 12 refs

Thirty five patients with clinical evidence of aortic insufficiency were studied by echocardiography Eleven patients had characteristic diastolic fluttering of the mitral valve (30 to 40 Hz, maximal amplitude 4 mm) In five others the fluttering was classified as equivocal In a control group of 500 echocardiograms in patients without evidence of aortic insufficiency, there were three examples of equivocal fluttering Atrial fibrillation also produces diastolic fluttering but of slower frequency

(Author)

A70-22217 Effects of acute oxygen deficiency on blood electrolyte concentrations of men adapted and non-adapted to altitude (Wirkungen eines akuten Sauerstoffmangels auf die Blutelektrolytkonzentrationen bei hohengepassten und nicht-hohengepassten Menschen) Dieter Boning (Deutsche Sporthochschule, Cologne, West Germany) *Pflügers Archiv*, vol 314, no 3, 1970, p 217-230 32 refs In German Research supported by the Deutsche Forschungsgemeinschaft

Twelve students not adapted to altitude and 6 athletes who had stayed in Flagstaff and Mexico City (2300 m altitude) for 4-6 weeks inspired a gas mixture with only 10.5% O₂ for 40 minutes Before the period of acute oxygen deficiency the chloride concentration in red cell water in venous blood of the athletes was 16 mval/l lower than in the red cells of the controls Presumably the concentration of organic phosphates increases during adaptation to altitude During the period of acute oxygen deficiency pO₂ dropped from 50 to 30 Torr Chloride and particularly sodium concentrations in red cell water increased The increase was higher in the blood of the olympic athletes The concentration of inorganic phosphates decreased in plasma and red cells of both groups The changes of the concentration of sodium and inorganic phosphates seem to be caused by the alkalosis which follows the hypoxic hyperventilation (Author)

A70-22221 An operational safety program for ophthalmic hazards of microwave Laurent P LaRoche, Albert F Braun (Pan American World Airways, Inc., Aerospace Services Div., Patrick AFB, Fla.), and Milton M Zaret (Zaret Foundation, Inc., Scarsdale, N Y) *Archives of Environmental Health*, vol 20, Mar 1970, p 350-355 5 refs

Description of the extensive microwave radiation exposure control program introduced by the Pan American Aerospace Services

Division to control biological hazards resulting from microwave radiation which can produce significant damage, particularly to the lens of the eye It is shown that this damage, which is irreversible, is characterized by loss of transparency in the lens known as opacification or cataract The basic objectives of the control program, as well as factors contributing to the complexity of these objectives, including surveying of microwave-producing systems, and clinical examinations of employees, are described and discussed in detail As an example, several microwave injury cases, and clinical results of their examination, are reported O H

A70-22276 Computer analysis of the orthogonal electrocardiogram in pulmonary emphysema Andrew Kerr, Jr., Arnold Adicoff, Jack D Klingeman, and Hubert V Pipberger *American Journal of Cardiology*, vol 25, Jan 1970, p 34-45 34 refs NIH Grant No HE 09696

Study of orthogonal electrocardiograms (Frank system) from 405 patients with pulmonary emphysema of moderate and severe degree Of 333 electrocardiographic measurements computed from each record, different sets of diagnostic criteria were selected for optimal separation of records of patients with pulmonary emphysema from those of normal subjects, using a variety of statistical techniques Special attention was devoted to factors contributing to electrocardiographic changes, as well as to differentiation from myocardial infarction and correlations with arterial pCO₂ The results of the study emphasize the need for quantitating electrocardiographic findings to improve diagnostic classification and correlations with other physiologic parameters

M V E

A70-22277 The cardiomyopathies—Order from chaos Reginald E B Hudson (National Heart Hospital, London, England) *American Journal of Cardiology*, vol 25, Jan 1970, p 70-77 7 refs

Review of the main features and characteristics of primary cardiomyopathies Cardiomyopathy is a disease of the myocardium, endocardium or epicardium or of all three There are two main groups primary and secondary In primary (idiopathic) cardiomyopathy, there is no coronary arterial or valvular abnormality, no hypertension and no vascular shunt inside or outside the heart, but there may be cardiomegaly, endocardial thickening, mural thrombosis, or myocardial scarring or other lesions There are three subdivisions, namely, fibrotic lesions, hypertrophic lesions, and those associated with pregnancy or the puerperium Secondary cardiomyopathies comprise a vastly greater group in which the heart is involved in a well known disease process, congenital or acquired, or damaged by known trauma, drugs or other noxious agents The diagnosis of primary cardiomyopathy is by exclusion, in life, this means thorough investigation to exclude all secondary causes After death, it may require examination of the conducting system in addition to thorough routine study The result is often inconclusive

M V E

A70-22295 The standardization of human factors data Stuart O Parsons and John L Lebach (Lockheed Missiles and Space Co., Sunnyvale, Calif.) *Human Factors*, vol 12, Feb 1970, p 55-62

Thirty-two human factors data forms used by six organizations participating in the definition of the NASA Apollo Applications Program were analyzed to develop a standard reporting technique compatible with computer data processing methods The analysis provided a matrix of 17 data and document types by 43 content areas Six user organizations indicated their information requirements by filling out the matrix sheet High frequency data items formed the basis for developing a single format that can be used initially in any manned space task equipment analysis, maintenance analysis, and training requirements analysis (Author)

A70-22301 * Active bone marrow distribution in the monkey S T Taketa (NASA, Ames Research Center, Moffett Field, Calif.), Arland L Carsten, Stanton H Cohn, Harold L Atkins, and Victor P Bond (Brookhaven National Laboratory, Upton, N Y)

Life Sciences, Part II—Biochemistry, General and Molecular Biology, vol 9, Feb 8, 1970, p 169-174 8 refs NASA-AEC-supported research

Although the rhesus monkey continues to be used extensively in experimental studies and is also being investigated intensively for basic knowledge of the animal itself, a review of the literature failed to reveal data concerning the volume and distribution of active bone marrow. Since this information would be of practical importance in evaluating radiation injury to hematopoietic tissue, especially in nonuniform exposure simulating accidental exposure or space radiation conditions, the study reported here was undertaken.

(Author)

A70-22302 * **A study of the mechanism of action of streptomycin in *Euglena gracilis*** David Drown and Raymond A Galloway (Maryland, University, College Park, Md.) *Archiv fur Mikrobiologie*, vol 68, 1969, p 377-386 23 refs Grant No NGR-21-002-003

Although the effect of streptomycin (SM) on the chloroplasts of *Euglena* has been studied for many years, the exact nature of the biochemical lesion has escaped detection. The purpose of this study was to determine if chlorophyll loss could be explained in terms of a differential effect of streptomycin on what has been recently shown to be the different ribosomal systems of the chloroplast and the cytoplasm of *Euglena*. The chloroplastic ribosomal system was found to be more sensitive to the action of streptomycin than the cytoplasmic ribosomal system. Agents such as divalent cations and various species of RNA were found to partially reverse the inhibitory effects of SM, possibly by 'inactivation' of SM.

(Author)

A70-22318 **Effect of whole-body X-irradiation on tyrosine hydroxylase and catecholamine levels** Melvin H. Van Woert and Frances Korb (Yale University, New Haven, Conn.) *Life Sciences, Part I—Physiology and Pharmacology*, vol 9, Feb 15, 1970, p 227-232 16 refs AEC Contract No. AT (30-1)-3960, PHS Grant No. NB-07542-02

Experimental investigation of the effect of total-body X-irradiation on the levels of catecholamines and tyrosine hydroxylase in the rat. An increase in adrenal tyrosine hydroxylase activity was found, following 1800 R total body X-irradiation. This suggests that increased enzyme synthesis may be another mechanism of regulation of catecholamine production.

M M

A70-22329 * **Effect of environmental temperature on the toxicity of caffeine and dextroamphetamine in mice** Patricia J. Muller and Joan Vernikos-Danellis (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.) *Journal of Pharmacology and Experimental Therapeutics*, vol 171, no 1, 1970, p 153-158 35 refs

Experimental investigation of the effects of mild environmental temperature changes and dehydration, as well as combinations of these, on the toxicity of caffeine and dextroamphetamine in mice. The experimental results indicate that alterations of the environmental temperature markedly affect drug toxicity. They emphasize that such alterations do not have to be particularly drastic but that mild variations in temperature are effective.

M M

A70-22330 * **Sterols of *Chlorella* III—Species containing ergosterol** Glenn W. Patterson (Maryland, University, College Park, Md.) *Comparative Biochemistry and Physiology*, vol 31, 1969, p 391-394 10 refs Grant No. NGR-21-002-003

Analysis of 5 *Chlorella* species. All five species were found to contain ergosterol as their major sterol. Present in smaller amounts were 22-dihydroergosterol, delta seven ergosterol, and 5-dihydroergosterol. Under the conditions employed, sterols made up approximately 0.2% of the dry weight of the cells. All five species were similar with respect to sterols, both qualitatively and quantitatively.

M M

A70-22331 * **Personality and respiratory responses to sound and light** Mary McCollum, Neil R. Burch, and Robert Roessler (Baylor University, Texas Research Institute of Mental Sciences, Houston, Tex.) *Psychophysiology*, vol 6, no 3, 1969, p 291-300 14 refs NIH Grant No. MH-13630, PHS Grant No. FR 00254, Grants No. AF AFOSR 727-031, No. NGR-44-003-031

Examination of the respiratory amplitude (RA) and respiratory rate (RR) parameters in student subjects (Ss) following stimulation with five intensities of sound and five intensities of light. All Ss were divided into high and low ego strength (Es) groups on the basis of their scores on the Barron scale. These groups were balanced for alertness-drowsiness by EEG criteria. High Es Ss responded with a greater increase in RA than low Es Ss and there was a strong trend for high Es Ss to respond less than low Es Ss in RR. Both RA and RR increased following stimulation, with the greatest changes following greater intensities of stimulation in both modalities.

M M

A70-22335 * **Environmental lighting and neuroendocrine function—Relationship between spectrum of light source and gonadal growth** Richard J. Wurtman and Jeffrey Weisel (MIT, Cambridge, Mass.) *Endocrinology*, vol 85, Dec 1969, p 1218-1221 11 refs Grant No. NGR-22-009-272

Study of the effects of various broad-spectrum light sources on the development and function of the mammalian endocrine apparatus. Rats were born and reared under a standard light source (cool-white fluorescent bulbs) or a source which more closely simulates the solar spectrum (Vita-Lite bulbs). They were killed at 50 days of age and various organs were weighed. Both male and female rats exposed to illumination from cool-white bulbs had smaller gonads and larger spleens than animals maintained under the more physiological source.

M V E

A70-22336 * **Oxygen enhancement ratio and RBE of helium ions on mouse lymphoma cells** Jose M. Feola, John H. Lawrence, and Graeme P. Welch (California, University, Berkeley, Calif.) *Radiation Research*, vol 40, Nov 1969, p 400-413 44 refs NASA Contract No. R-09 019-912

Measurements of the relative biological effectiveness of accelerated helium nuclei on mouse ascites tumor cells grown in vivo and irradiated in vitro. Plateau and Bragg peak irradiations, both with particles from the 910 MeV beam frequently used in therapy and with a lower energy beam with smaller energy spread (and hence also smaller linear energy transfer spread) have the same effect for oxygenated cells and for plateau particles of anoxic cells, but a twice stronger effect for anoxic cells irradiated at the Bragg peak. This information may be useful for predicting effects in setting up radiation therapy schedules utilizing Bragg-peak irradiation.

M V E

A70-22340 * **The vacuum probe sampler** W. J. Whitfield and M. E. Morris (Sandia Laboratories, Albuquerque, N. Mex.) (American Association for Contamination Control, Annual Technical Meeting and Exhibit, 8th, New York, N.Y., May 19-22, 1969, Proceedings, p. 23-26.) *Contamination Control*, vol 9, Feb 1970, p 10-15, 25 7 refs Contract No. NSR-09-019-040 (For abstract see issue 05, page 808, Accession no. A70-16703)

A70-22342 **Attention and cue-producing responses in response-mediated stimulus generalization** Thomas E. Malloy (Utah, University, Salt Lake City, Utah) and Henry C. Ellis (New Mexico, University, Albuquerque, N. Mex.) *Journal of Experimental Psychology*, vol 83, Feb 1970, p 191-200 16 refs NSF Grants No. GB 3432, No. GB 7926

The generalization of verbal identifying responses, using a mediated generalization paradigm, was measured following training designed to produce acquired equivalence or distinctiveness of cues. Acquired equivalence training produced an increase in S's tendency to give generalized responses to test stimuli, relative to control Ss.

given comparable practice in observing the stimuli as a control for attention to cues. This finding was interpreted as consistent with the view that attaching common verbal responses to different stimuli generates common response-produced cues which increase the functional or effective equivalence of the stimuli. In turn, greater generalization occurred following practice in observing the stimuli as compared with control Ss who received no pretraining. The acquired equivalence finding does not necessarily imply that the pretraining stimuli have become perceptually more similar, in the sense of same-difference discrimination performance. No complementary finding was obtained with acquired distinctiveness training, a finding discussed in terms of the stringent control condition. (Author)

A70-22392 **Startle and other human responses to noise.** J Semotan and M Semotanová (Prague Mental Hospital, Prague, Czechoslovakia) *Journal of Sound and Vibration*, vol 10, Nov 1969, p 480-488, Comments, M Oldman (Southampton, University, Southampton, England), p 488, 489 56 refs

Discussion of the complex action of noise upon man and review of man's various responses to noise. It is shown that noise proves to be an ever present noxious factor in modern man's environment, and that it seems to be a necessary concomitant of technological progress. Its actual importance is hardly ever fully appreciated. Startling noises are much more disturbing than an examination of their physical qualities would suggest since they evoke in man deep instinctive reactions. The discussion is intended to serve as an appeal to combine forces for reducing noise in all its forms. M V E

A70-22473 # **Tactics of an ophthalmologist for severe thermomechanical eye injuries (Taktika oftal'mologa pri tiazhelykh termomekhanicheskikh porazheniakh glaz)** V V Volkov, V G Shiliaev, and A N Strazhkin *Voenna-Meditsinskii Zhurnal*, Dec 1969, p 39-43. In Russian

Description of certain principles for administering specialized ophthalmological treatment after severe thermomechanical eye injuries, using experimental data obtained with animals. Studies involved the duration, methods of healing, and the origin of severe radiant-energy burns of rabbit eyelids and surrounding tissues which were coupled with mechanical trauma. Comparisons were made between passive (conservative treatment) and active (surgical treatment) procedures. The effectiveness of stitches is discussed along with the use of antibiotics. Procedures which should be followed in the case where foreign objects have entered the eye in the damaged region are outlined. T M

A70-22474 # **Noncoronarygenic afflictions of the myocardium in flight personnel (Nekoronarogennye porazheniia r..okarda u letnogo sostava)** E T Malyshev and N A Gol'din *Voenna-Meditsinskii Zhurnal*, Dec 1969, p 53-57 10 refs. In Russian

Discussion of certain clinical and diagnostic aspects of postinfectious afflictions of the myocardium in flight personnel. The topics considered are important due to the lack of a clear clinical record of the affliction and due to the absence of a definite diagnostic differentiation from atherosclerotic cardiosclerosis (atherosclerotic afflictions of the myocardium). Factors indicating the presence of the condition are discussed, and 10 year case histories are analyzed for flight personnel with diagnosed inflammatory myocardial myocardiosclerosis. Variations in electrocardiogram records are illustrated. T M

A70-22475 # **Prospects for developing methods of vestibular selection in aviation (Perspektivy razvitiia metodov vestibularnogo otbora v aviatsii)** E M Iuganov, S S Markarian, E V Lapaev, and I A Sidel'nikov *Voenna-Meditsinskii Zhurnal*, Dec 1969, p 57-61. In Russian

Survey of currently available knowledge concerning optimum vestibulometric techniques for medical examination and candidate selection in aerospace medicine. It is shown that continuously accumulating Coriolis accelerations acting in conjunction with hypoxia provide an effective means of discovering hidden forms of vestibulovegetative instability. Professional vestibular evaluation should be conducted in the period immediately following the action of those factors which are characteristically encountered by the subject in his flight environment. T M

A70-22496 * **Neural information processing—Windows without and the citadel within** W Ross Adey (California, University, Los Angeles, Calif.) In *Biocybernetics of the central nervous system*. Edited by L D Proctor. Boston, Little, Brown and Co., 1969, p 1-27 59 refs. NIH Grants No. NB-01883, No. MH-03708, Contracts No. AF 49(638)-1387, No. Nonr-233(91), Grants No. NSG 237-62, No. NSG-502, No. NSG-505

The article discusses neural information processing taking into consideration the differences between the living brain and the typical artificial processor. Essential aspects of nervous processing are examined giving attention to the establishment of the excitability threshold in sensory neurons and to the shift in coding patterns at central levels in the nervous system. The neuron in the brain is considered as a component in a multicompartamental neuronal system. Phenomena at the neuronal membrane surface are examined and patterns of electric activity in cerebral tissue are discussed. EEG correlates of behavioral processes are analyzed and some unifying hypotheses are presented.

A70-22524 * **Vectorcardiogram and aortic blood flow of squirrel monkeys (Saimiri sciureus) in a strong superconductive electromagnet** Dietrich E. Beischer (U.S. Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla.) In *Biological effects of magnetic fields*. Volume 2. Edited by M. F. Barnothy. New York, Plenum Press, 1969, p 241-259 9 refs. NASA Contract No. R-39

Description of the results of a study of blood flow of squirrel monkeys, using a superconductive magnet with high field strength, and with the application of vectorcardiographic leads. The study furnished much stronger and clearer signals regarding the increase in the T wave amplitude of the ECG than those of previous studies (Beischer and Knepton, Jr., 1964; Togawa and Ohima, 1967). The observed increase of the T wave has been confirmed to be a superimposition on the ECG of the emf generated by blood flow, as first suggested by Togawa. The magnetic method provides, in a single record, information on the electrical and mechanical activity of the heart and represents a new, noninvasive method of studying cardiac performance. M M

A70-22525 * **Time-dependent variations in amino acid metabolism—Mechanism of the tyrosine transaminase rhythm in rat liver** Richard J. Wurtman (MIT, Cambridge, Mass.) In *Advances in enzyme regulation*. Volume 7. Oxford, Pergamon Press, 1969, p 57-67 22 refs. NIH Grants No. AM-11237, No. AM 11709, Grant No. NGR-22-009 272

Experimental investigation of the mechanism governing the tyrosine transaminase rhythm in rat liver. The experimental results indicate that the activity of tyrosine transaminase in the rat liver shows marked time dependent variations that appear to be generated by the interaction of an endogenous factor constituted by the tendency of the animal to eat cyclically, and an exogenous factor represented by the presence of protein in the diet. Late in the daylight period, the animal begins to increase its rate of food consumption, as a result, the liver is perfused cyclically with relatively large amounts of tryptophan and other amino acids via the portal circulation. These amino acids act as a signal which instructs the hepatic cells to increase the activity of the transaminase. The concentrations of tyrosine and other amino acids in human plasma also show regular diurnal fluctuations. These rhythms appear to be

generated by other mechanisms in addition to the enzyme rhythms inasmuch as they involve all the amino acids and persist in subjects fed only minimal amounts of protein M M

A70-22529 # Experiments with systematically disturbed sensorimotor coordination (Experimente mit systematisch gestörter sensomotorischer Koordination) Manfred Ritter Innsbruck, Universität, Philosophische Fakultät, Dr Dissertation, 1968 126 p 56 refs In German

The dissertation is concerned with experiments conducted to analyze the effect of some parameters on the recorelation of the eye-hand-system. General concepts of sensorimotor coordination are examined and various theories of adaptation processes are reviewed. Experiments are described for studying the effect of a reduction in the scale of motions and for investigating the effect of a difference between the inclination of the head and the axis of symmetry of the displacement. Another parameter investigated is the influence of the angle between direction of vision and direction of motion. An analysis of exercises performed under various conditions is conducted G R

A70-22549 # Toxicology of the active life products and their significance to the formation of an artificial atmosphere in pressurized compartments (Toksikologiya produktov zhiznedeiatel'nosti i ikh znachenie v formirovani iskusstvennoi atmosfery germetizirovannykh pomeshchenii) V V Kustov and L A Tiunov Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 11), 1969 132 p 492 refs In Russian

A study is made of the formation mechanism of gaseous products associated with an active human life, and the effect of various factors on this formation. Quantitative and qualitative characteristics of certain gaseous products of an active life are examined including exhaled air, urine, feces, and perspiration. The available data on the toxic effects of the chief metabolic excretions on the animals and man are presented. An examination is made of a hygienic control of the contents of these excretions in the pressurized compartments such as space vehicles Z W

A70-22669 Binocular depth perception and the optic chiasm Colin Blakemore (California, University, Berkeley, Calif.) *Vision Research*, vol 10, Jan 1970, p 43-47 14 refs PHS-supported research

Discussion of the effects of a damage to the optic chiasm on the depth perception of a human. It is demonstrated that after sagittal transection of the optic chiasm, a human can still recognize the depth of an object briefly exposed in front of his fixation point, even though its images fall upon temporal retina in both eyes and therefore project separately to the two hemispheres. There might be an interhemispheric link for binocular integration in central vision O H

A70-22670 Binocular depth perception and the corpus callosum Donald E Mitchell and Colin Blakemore (California, University, Berkeley, Calif.) *Vision Research*, vol 10, Jan 1970, p 49-54 25 refs Research supported by the University of California and PHS

Discussion of the effects of a damage to the corpus callosum on the depth perception of a human. It is demonstrated that an object lying directly behind or in front of the fixation point has images that project to separate hemispheres through the two eyes. A split-brain human cannot interpret the depth of such an object although his peripheral stereopsis is normal. There must be an interhemispheric link for binocular integration in central vision O H

A70-22671 Critical flicker frequency as a function of viewing distance, stimulus size and luminance Lewis O Harvey, Jr (MIT, Cambridge, Mass.) *Vision Research*, vol 10, Jan 1970, p

55-63 34 refs

Critical flicker frequency (CFF) was measured for viewing distances ranging from 8.6 to 582 cm, with test stimuli ranging from 53 sec to 16 deg visual angle for 26.9 mL, 2.69 mL and 0.269 mL luminances. The main finding of this study is that for stimuli of constant visual angle and luminance, CFF increases with viewing distance up to one meter. CFF also increases with luminance and angular size. It is suggested from the present data and from the literature, that receptive fields become smaller with increased luminance and grow larger with increased accommodation and convergence (Author)

A70-22672 Spatio-temporal integration in binocular-kinetic space perception David N Lee (Harvard University, Mattapan, Mass.) *Vision Research*, vol 10, Jan 1970, p 65-78 21 refs Research supported by the Boston City Hospital, Contract No. Nonr-1866(52)

Information about movement (i.e. kinetic information) is picked up binocularly from a disparate pair of time-varying optical inputs by means of a perceptual spatio-temporal integration process. The nature of this process was investigated by alternating the exposures of a moving target to the two eyes, and systematically varying both the temporal and luminance relations between the binocular inputs. Depending upon these stimulus relations different depth percepts resulted, indicating that differential binocular pairing was occurring, with very high temporal precision, between that pair of neural signals between which there was the smaller offset-onset temporal disparity. Both the upper and lower temporal limits of the phenomenon were investigated. The phenomenon was observed even under flicker-fusion conditions, indicating that the information about temporal discontinuity was still available for perceptual processing, even though the illumination was seen as temporally continuous (Author)

A70-22673 Calibration of flashtube photostimulators in electroretinography J R Brunette and S Molotchnikoff (Maisonneuve Hospital, Montreal, Université, Montreal, Canada) *Vision Research*, vol 10, Jan 1970, p 95-102 8 refs Research supported by the Canadian Medical Research Council

Discussion of the determination of the quantity of light emitted by physiological flashtube photostimulators in electroretinography. Following a general review of the flashtube design and calibration, the physiological response of the human eye to rapid flashes of the light is examined. The spectral sensitivity of light measuring devices is discussed, and a simple light meter design is suggested. In conclusion, descriptive data for photostimulator calibration are presented to ensure reproducibility of the values obtained O H

A70-22674 * Evoked potentials to stimuli presented to the suppressed eye in a binocular rivalry experiment E Donchin (NASA, Ames Research Center, Moffett Field, Calif.) and L Cohen (Stanford University, Stanford, Calif.) *Vision Research*, vol 10, Jan 1970, p 103-106 6 refs

Discussion of visually evoked cortical potentials (VECP) to different probe stimuli presented to the suppressed human eye in different binocular rivalry experiments. Experimental results obtained by some authors using flickering, or sinusoidally varying stimuli, indicate that the VECPs are not affected by the dominance status of the eye. These results are, however, not consistent with the data obtained in flash experiments. The differences between these results highlighting some problems involved in the study of the VECPs, are examined and discussed O H

A70-22675 The transparency of the corneal stroma D M Maurice (Stanford University, Stanford, Calif.) *Vision Research*, vol 10, Jan 1970, p 107, 108 8 refs

Discussion of the structural basis of the transparency of the corneal stroma in the light of two different theories. The uniform refractive index theory, and the lattice theory, both explaining the

transparency of the corneal stroma, are compared and discussed. In author's opinion various considerations led to the rejection of the refractive index theory in favor of the lattice theory O H

A70-22761 Directional dependence of spectrum and correlation functions of the signals received at the ears (Richtungsabhängigkeit von Spektrum und Korrelationsfunktionen der an den Ohren empfangenen Signale) P Damaske (Göttingen, Universität, Göttingen, West Germany) *Acustica*, vol 22, no 4, 1969-1970, p 191-204 30 refs In German

Broadband noise is presented to an artificial human head with built-in microphones as ears. For directions of sound incidence in the median plane the loudness densities of the signals received at the ears of this dummy-head are measured. By this the directional dependence of masking for the median plane can be explained. Furthermore the auto- and crosscorrelation functions of the ear signals are measured for real sound sources and for phantom sources of numerous spatial directions. The interaural time difference is determined from the crosscorrelation functions. The limiting frequencies of the received noise signals are determined from the autocorrelation functions. The influence of these limiting frequencies on the apparent elevation angles of sound sources in the median-plane is investigated. Directional hearing tests are carried out for this with real sound sources as well as with phantom sources.

(Author)

A70-22762 Sound localization in the median plane J Blauert (Rheinisch-Westfälische Technische Hochschule, Aachen, West Germany) *Acustica*, vol 22, no 4, 1969-1970, p 205-213 19 refs

Psychoacoustic measurements with observers who were stimulated at both ears with identical narrow band signals yielded the following results. The sound sensations of the observers were localized in the median plane. The direction of the sound sensation is a function of frequency only and does not depend on the angle of incidence. Physical measurements of the linear distortions caused by the pinna showed further, that the pinna and the hearing system behind the pinna work together in such a way, that sound localization of broad band signals in the median plane can also be explained.

(Author)

A70-22763 Subjective and objective duration of sound impulses and sound pauses (Subjektive und objektive Dauer von Schallimpulsen und Schallpausen) E Zwicker (München, Technische Hochschule, München, West Germany) *Acustica*, vol 22, no 4, 1969-1970, p 214-218 6 refs In German. Research supported by the Deutsche Forschungsgemeinschaft.

The sensation of duration of impulses, pauses and intervals between two short impulses is measured. The accuracy of adjustment is about 10%. At the same physical duration a pause produces a sensation only half of that of an impulse while the sensation of a pause and an interval are almost equal. The sensation of duration increases proportionally to the physical duration for values greater than 100 ms. For smaller values the sensation function is more flat.

(Author)

A70-22767 * Bacterial growth in agar subjected to freezing and thawing. I R E Cameron (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), G B Blank (California, University, Los Angeles, Calif.), and N H Horowitz (California Institute of Technology, Pasadena, Calif.) *Cryogenic Technology*, vol 5, Nov-Dec 1969, p 253-255

Discussion of the collection of soil samples and of their composition in preparation of tests for investigating the survivability of micro-organisms found in soils near spacecraft assembly areas when the organisms are subjected to simulated Martian freeze-thaw cycles. A number of photographs are presented showing the areas from which soil samples were taken. Nonmicrobiological properties for the composite sample are given.

G R

A70-22768 * Bacterial growth in agar subjected to freezing and thawing. II. R E Cameron (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), G B Blank (California, University, Los Angeles, Calif.), and N H Horowitz (California Institute of Technology, Pasadena, Calif.) *Cryogenic Technology*, vol 6, Jan-Feb 1970, p 16-18 16 refs

Investigation of the survivability of micro-organisms found in soils near spacecraft assembly areas when subjected to simulated Martian freeze-thaw cycles. The abundance of aerobic and anaerobic bacteria in a representative soil sample was determined in trypticase soy agar plates subjected to temperature conditions of (1) room temperature 25 deg C, (2) diurnal freezing, -75 deg C for 16 hr, and thawing, 25 deg C for 8 hr, and (3) continuous freezing at -75 deg C. It was found that no bacteria grew during continuous freezing at -75 deg C. Aerobes grew during diurnal freezing and thawing.

G R

A70-22789 # Emergence and development mechanisms of early permeability deterioration in skin vessels locally exposed to radiation (Über die Entstehung und die Entwicklungsmechanismen der frühen Schädigungen der Durchlässigkeit von Hautgefäßen bei lokaler Bestrahlung) P Ia Gaponiuk and L I Uklonskaya (Akademia Meditsinskikh Nauk SSSR, Obninsk, USSR) *Radiobiologia-Radiotherapia*, vol 10, no 1, 1969, p 109-118 22 refs In German

Investigation of the permeability disturbances in the skin capillaries of rabbits and rats following exposure to Sr90-Y90 beta radiation. The permeability of the skin vessels was determined by means of Evans-blue and Na fluorescein indicators. Quinine-formation inhibitors and antihistamine compounds were used in the attempt to elucidate the mechanisms of the permeability disturbances of the capillaries. Data on radiation amounts starting the deterioration and inflicting damage of varied endurance are presented. From the results yielded by the use of quinine inhibitors and antihistamine compounds, inferences were drawn about the quinine medication of early permeability disturbances in the skin of rabbits and rats.

M V E

A70-22790 # Changes in the higher nerve activity of apes following chronic total body exposure to gamma radiation (Veränderungen der höheren Nerventätigkeit von Affen nach chronischer Ganzkörpergammaabstrahlung) Š L Džalagonija and Ė K Džikidze (Akademia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR) *Radiobiologia-Radiotherapia*, vol 10, no 1, 1969, p 119-126 8 refs In German. (Translation)

Investigation of the effects on higher mammals of chronic exposure to gamma radiation. Four mature male mandrill baboons underwent for over five years chronic total body exposure to low doses (about 1 R per day) of radiation. Subsequent examination of higher nerve activity revealed considerable workout difficulties with respect to food-movement conditioned reflexes. However, after a protracted (about 10-month long) training, they acquired the capability of sufficiently accurate discrimination of signals of conditioned auditory and visual stimuli. The simultaneously observed distinct changes in nervous-activity processes resulted in reduced physical strength, balance and agility. The radiation effects made these apes resemble animals with characteristically weak nervous systems.

M V E

A70-22791 # Effect of H2O2 infusion on skin remission following exposure to ionizing radiation (Der Einfluss einer H2O2-Infusion auf die Hautremission nach einer ionisierenden Bestrahlung) H Baudach, E Magdon (Deutsche Akademie der Wissenschaften, Institut für Krebsforschung, Berlin, East Germany), and A Szekulesz *Radiobiologia-Radiotherapia*, vol 10, no 1, 1969, p 127-132 31 refs In German

Investigation of the relevance of remission measurements to the evaluation of the effect of H2O2 infusion upon the behavior of erythema following exposure to ionizing radiation. After infusion of a H2O2 solution, the femoral arteries of both the treated and the (as

a control) untreated hind legs of rabbits were ligated. Both legs were then exposed to X-radiation, and the radiation reaction was assessed by means of remission measurements. The leg infused with H2O2 showed a significantly intensified radiation reaction in the deep tissue layers. The already earlier proposed procedure of limiting the remission measurements to three wave lengths only is proved correct for the assessment of skin reactions to ionizing radiation, too. M V E

A70-22800 * Fine structure of the parathyroid gland of the laying hen (*Gallus domesticus*) Timo Nevalainen (Pennsylvania State University, University Park, Pa.) *General and Comparative Endocrinology*, vol 12, June 1969, p 561-567 24 refs NIH Grant No DE-01764, Grant No NGR-39 009-008

Electron microscopic study of the parathyroid glands of five laying White Leghorn hens. The Golgi apparatus was well developed and consisted of dilated cisternae and vesicles. Numerous small prosecretory granules, 0.05 micron in diameter were observed in the Golgi area, and in the cytoplasm outside the Golgi complex a few large, approximately 0.1 to 0.4 micron in diameter, electron dense membrane-bound mature secretory granules were observed in the cytoplasm. There were also coated vesicles in the cytoplasm, and sometimes they were seen fused with the plasma membrane. It is suggested that most of the secretory product in the actively secreting parathyroid gland of the laying hen is transported as small prosecretory granules from the Golgi apparatus out of the cell, and that only a minority of them coalesce to form mature storage granules. (Author)

A70-22814 # Protection of lethally irradiated mice by the bone marrow of donors irradiated by high-energy protons (Schutz letal bestrahlter Tiere durch Knochenmark von Spendern, die mit Protonen hoher Energie bestrahlt wurden) L V Koval'chuk *Radiobiologia-Radiotherapia*, vol 10, no 2, 1969, p 215-222 11 refs In German (Translation)

Investigation of the therapeutic power of bone marrow transplanted from donors exposed one month before to high energy proton radiation. The bone marrow from mice previously exposed to a 600 R irradiation with high-energy (630 MeV) protons was transplanted to mice of the same strain just irradiated with 1000 R. The donors were used one month after irradiation. The suspensions of bone marrow had twenty million cells per mouse. It is shown that the preirradiated bone marrow has the same protective effect as intact bone marrow. Only its power of repopulating the lymphatic tissue is somewhat inferior to that of intact bone marrow. M V E

A70-22815 # Effect of ionizing radiation on the developing cerebellar cortex of rats (Über die Wirkung ionisierender Strahlen auf die sich entwickelnde Kleinhirnrinde der Ratten) J V Korogodina, V S Nesterenko, and V M Dubrovina (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) *Radiobiologia-Radiotherapia*, vol 10, no 2, 1969, p 227-240 8 refs In German

Investigation of the effects of ionizing radiation on the tissues of the cerebellar cortex. The observations made confirm the high sensitivity to radiation not only of the cerebellar cortex development, but also of the cortical tissues and neuroblasts. Even after very high (nearly 60 per cent) cell losses following irradiation by 200 R, nearly complete compensation through subsequent regeneration processes was observed. Evidence for this regeneration was obtained from histological examinations and weighings of the cerebellum 10 days after irradiation. The radiation effects on differentiation processes proved very important. Functional examination of the cerebellar cortex surface revealed disturbances in the formation of the synaptic apparatus over at least a part of the irradiated cells and their offspring. M V E

A70-22816 # The effect of low intensity laser radiation, repeated over a long period of time, on the skin and internal organs of mice (Die Wirkung der über längere Zeit wiederholt verabreichten

Laserstrahlung geringer Intensität auf die Haut und inneren Organe von Mäusen) E Mester (Chirurgische Universitätsklinik, Budapest, Hungary), B Szende (Budapesti Orvostudományi Egyetem, Budapest, Hungary), and J G Tota (Ungarische Akademie der Wissenschaften, Laser-Laboratorium, Hungary) *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 371-377 5 refs In German

Results of exposing the abdominal skin of 10 male C57 B1 mice to 1 J of laser radiation once a week for a total of 35 exposures. Inflammatory symptoms, followed by destruction of the hair follicles, and finally epithelial atrophy were observed. In some cases regeneration nodes originating from the basal cells of the epithelium were noted. In some of the mice necrosis of the liver or of the small intestine developed. F R L

A70-22817 # Cumulative effects of fractionally administered laser radiation (Über die Summation fraktioniert verabreichter Laserstrahlung) E Mester (Chirurgische Universitätsklinik, Budapest, Hungary), B Szende (Budapesti Orvostudományi Egyetem, Budapest, Hungary), and J G Tota (Ungarische Akademie der Wissenschaften, Laser-Laboratorium, Hungary) *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 379-383 In German

Study of the cumulative effects of laser radiation based on biological results. The halting of hair growth on C57 B1 mice was the test objective. It was found that a single dose of laser radiation was nearly equal to a fractionally administered laser radiation of the same quantity as far as biological effects were concerned. F R L

A70-22818 # H-3 thymidine distribution in the chromosomes of mammalian bone marrow cells after administration of various radioprotectors J Brasch (Országos Sugárbiológiai és Sugáregészsegügyi Kutató Intézet, Budapest, Hungary) *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 419-428 28 refs

Experimental study of the distribution of labelling in the bone marrow chromosomes and single chromosomal segments of rats and mice treated with various radioprotectors, following the administration of labelled thymidine (H-3 T). The labelling of the mitotic indices was also studied. It was found that the sulfhydryl type radioprotectors reduced the metabolic activity of cells, thereby inhibiting them from entering the S phase or delaying the accomplishment of the DNA synthesis of the cells already in the S phase. F R L

A70-22819 # The present state and developmental tendencies in the construction of whole-body counters (Stand und Entwicklungstendenzen beim Bau von Ganzkörperzahlern) U Dreutler and R Maushart *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 429-436 In German

Demonstration that whole-body counters are sufficiently developed, both technically and in methods of use, so that they can serve as necessary and valuable standard measuring devices in nuclear medicine and radiation protection. Further development is expected to bring improvements in detail, but without fundamental changes as long as the working principle is that of scintillation detectors. F R L

A70-22820 # Study of the specificity of the radioprotective effect of cholinomimetics and of the participation of cholinergic mechanisms in chemical protection against radiation (Untersuchungen zur Spezifität des radioprotektiven Effekts von Cholinomimetika und zur Beteiligung cholinergischer Mechanismen am chemischen Strahlenschutz) K Effler and A H Staib (Medizinische Akademie, Dresden, East Germany) *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 445-450 17 refs In German

Demonstration that a participation of cholinergic mechanisms,

resembling muscarine, for protective effect against radiation after administration of cholinomimetics, attacking in a central manner, is causally related to the specific effect of the cholinergic receptors. It is considered that hypoxemia, caused by these combinations, reduces the protective reactions against irradiation of tissues sensitive to radiation, thus increasing the rate of survival of mice reported by Straub and Patt (1963), especially with reference to anoxemia

F R L

A70-22821 # The role of small X-ray doses on the central nervous system (Die Wirkung kleiner Dosen von Röntgenstrahlen auf das Zentralnervensystem /ZNS/) T Vasulescu, V V Papilian, Z Nicoara, and M Kovacs (Institutul de Medicina și Farmacia, Cluj, Rumania) *Radiobiologia-Radiotherapia*, vol 10, no 3, 1969, p 451-464 9 refs In German

Continuation of previous studies concerning the role of technical factors on the biological effect of small X ray doses on the central nervous system. Histopathological studies indicate that mutations appear after irradiation by single doses of 50 R of the heads of rabbits. The existence of, and the dynamics of, mutations for rats, guinea pigs, chickens, and dogs is confirmed, as well as a dependence of the intensity, diffusion, and dynamics of these mutations on compounded technical factors. A double-phase aspect of the mutations appears after irradiation

F R L

A70-22822 # Function of adrenal cortex of rhesus monkeys after whole-body irradiation (Die Funktion der Nebennierenrinde bei Rhesusaffen nach Ganzkörperbestrahlung) N P Gončarov (Akademii Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR) *Radiobiologia-Radiotherapia*, vol 10, no 4, 1969, p 547-552 8 refs In German (Translation)

Study of the role played by hormones secreted by adrenal cortex in the pathogenesis of an acute radiation sickness in rhesus monkeys. It is found that the whole-body irradiation of rhesus monkeys with a sublethal dose of 570 r causes an increase of the 17-oxycorticoid level within the first hours after irradiation. After this, the corticosteroid level normalizes and remains unchanged for 7 to 9 days. With the appearance of the first symptoms of a haemorrhagic diathesis the 17-oxycorticosteroid level in the blood increases from about 40 to 98 and 165 units, respectively. For monkeys having a severe type of radiation sickness 17 alpha-oxyprogesterone is not discharged into the blood of the suprarenal vein and that is pointing to a disturbance of the process of steroid formation in the suprarenal gland

Z W

A70-22897 * Chemical and metabolic characteristics of brain tissue—Electrical impedance correlates R T Kado and W R Adey. In: *Methods and theory in psychochemical research in man*. Edited by A J Mandell and M P Mandell. New York, Academic Press, Inc., 1969, p 253-272 27 refs. PHS Grant No. MH-03708, Contract No. AF 49(638)-1387, Grant No. NSG 237-62

Brief review of measurement methods for the direct assessment of the dynamic properties of brain tissue. One method measures the electrical impedance of cerebral tissues by means of electrodes and of a Wheatstone bridge circuit which is used to balance the electrode impedance to zero and to provide an unbalance voltage proportional to impedance changes. Studies have been made in both the acute and chronic preparations in animals and with chronically implanted electrodes in man. Experimental results indicate that endogenous CO₂ production is far more influential than inhaling high levels of CO₂ in producing impedance changes, and supporting the hypothesis that the endogenous CO₂ shifts and the observed impedance changes may be produced by a common metabolic mechanism. It is concluded that at this time it appears highly unlikely that the experimental results regarding impedance changes may be attributed to a single mechanism or functional state. There are too many possible pathways for the current to take and too many elements in each of these pathways to allow assignment of sole responsibility for these changes. However, there are some known factors which are more likely than others. Of these, the extracellular space, having the lowest resistance to current flow, is a prime candidate

M M

A70-22898 * Glycogen accumulation following brain trauma W Haymaker, J Miquel (NASA, Ames Research Center, Moffett Field, Calif.), and M Z M Ibrahim (NASA, Ames Research Center, Moffett Field, Calif., Beirut, American University, Beirut, Lebanon). In: *Current research in neurosciences*. Edited by H T Wycis. Basel, Switzerland, S Karger AG (Topical Problems in Psychiatry and Neurology Volume 10), 1970, p 71-87 32 refs

Investigation of the scope of glycogen accumulation in the damaged brain of the rat. Partial transection of a cerebral hemisphere in rats resulted in large accumulations of glycogen in astroglia throughout the cerebral cortex of the injured side, and in some degree even in the opposite hemisphere. In other grey matter adjacent to the wound, glycogen accumulation was also observed. The hypothetical cause is discussed

O H

A70-22900 # Use of time-lapse photography in flight performance evaluation Robert N Isley and Paul W Caro, Jr (U.S. Army, Human Resources Research Organization, Fort Rucker, Ala.) *Journal of Applied Psychology*, vol 54, Feb 1970, p 72-76 12 refs

A time-lapse photographic technique for recording and scoring the in-flight performance of helicopter aviator trainees during a hypothetical tactical instrument mission is described. Data were derived from 16-mm films of the instrument panel readings of the TH-13T helicopter. Advantages, disadvantages, and other possible applications of the film technique are also discussed (Author)

A70-23002 Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) Edited by H W Kirchhoff (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Fürstentfeldbruck, West Germany). Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968 123 p. In German \$8 65

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Variation of the number of eosinophilic leukocytes in the blood of Starfighter pilots resulting from flying (Die Änderung der Zahl der eosinophilen Leukozyten im Blut von Starfighter Piloten durch das Fliegen) U Tettenborn (Bonn, Universität, Bonn, West Germany), p 10-15 6 refs (See A70-23004 09-05)

On the influence of flight stress upon the strength of blood clots (Über die Beeinflussung der Festigkeit von Blutgerinnseln durch fliegerische Beanspruchung) G Brilla (Bonn, Universität, Bonn, West Germany), p 16-21 11 refs (See A70-23005 09-05)

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Air accidents over sea and survival on sea (Flugunfälle über See und Überleben auf See) A Wentrup (Bundesministerium der Verteidigung, Marine, Kiel, West Germany), p 33-40 (See A70-23008 09-05)

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Heart frequency during parachute jumps (Herzfrequenz bei Fallschirmsparungen) H Renemann, Ph Beckhove, and H Roskamm (Freiburg, Universität, Freiburg im Breisgau, West Germany), p 48-53 10 refs (See A70-23010 09-05)

Stress and blood pressure behavior (Stress und Blutdruckverhalten) B Herter (München, Technische Hochschule, Munich, West Germany), p 54-58 (See A70-23011 09-05)

Psychic stress causing factors and psychic stress reactions (Psychische Stressoren und psychische Stress-Reaktionen) K Gerbert and B Falckenberg (Bundesministerium der Verteidigung, Fürstenfeldbruck, West Germany), p 59-71 15 refs (See A70-23012 09-04)

Measures for the preservation of stress tolerance (Massnahmen zur Erhaltung der Stress-Toleranz) H W Kirchhoff (Bundesministerium der Verteidigung, Fürstenfeldbruck, West Germany), p 72-79 7 refs (See A70-23013 09-04)

Training for keeping fit (Konditionstraining) A Drews (Kursanatorium, Mettnau, West Germany), p 80-85 21 refs (See A70-23014 09-05)

Type and amount of the body training for maintaining the physical fitness of a pilot (Art und Dosierung des Körpertrainings zur Erhaltung der körperlichen Leistungsfähigkeit des Piloten) M Anlauf (Ruhr-Universität, Bochum, West Germany), p 86-89 (See A70-23015 09-05)

Flight safety as a military and medical problem—Discussion between a flight surgeon and a flight safety officer (Flugsicherheit, ein militärisches und medizinisches Problem—Gespräch zwischen einem Fliegerarzt und einem Flugsicherheitsoffizier) J Garbe (Bundesministerium der Verteidigung, Fürstenfeldbruck, West Germany) and W Peterle (Bundesministerium der Verteidigung, Neubiberg, West Germany), p 90-94 (See A70-23016 09-05)

Hyperbaric oxygenation—Treatment of oxygen overpressure (Hyperbare Oxygenation—Sauerstoffüberdruckbehandlung) A Wandel (Bundesministerium der Verteidigung, Kiel, West Germany), p 95-107 (See A70-23017 09-04)

The problem of identification in a flying accident (Zum Problem der Identifikation beim Flugunfall) S Krefft (Bundesministerium der Verteidigung, Fürstenfeldbruck, West Germany), p 108-117 14 refs (See A70-23018 09-05)

A70-23003 Effect of flying upon the fibrinolytic activity in blood of jet pilots (Der Einfluss des Fliegens auf die fibrinolytische Aktivität im Blut von Jet-Piloten) E Kuhnke (Bonn, Universität, Bonn, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 1-9 In German

Investigation of the relationship between the extent of the growth of fibrinolysis and the degree of stress to which human organism is subjected. By using a special test method, a group of test pilots was tested during normal flights aboard the Starfighter aircraft. The results obtained in these measurements are presented and discussed. They also apply to other high-stress states in human organism. O H

A70-23004 Variation of the number of eosinophilic leukocytes in the blood of Starfighter pilots resulting from flying (Die Änderung der Zahl der eosinophilen Leukozyten im Blut von Starfighter-Piloten durch das Fliegen) U Tettenborn (Bonn, Universität, Bonn, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 10-15 6 refs In German

Investigation of the behavior of eosinophilic leukocytes in the blood of pilots following flights aboard modern high performance jet aircraft. The test method applied is described, and the results obtained are discussed. In general, a decrease of the eosinophile values can be observed. These values are then compared to the behavior of eosinophilic leukocytes following a physical strain of the human body. O H

A70-23005 On the influence of flight stress upon the strength of blood clots (Über die Beeinflussung der Festigkeit von Blutgerinnseln durch fliegerische Beanspruchung) G Brilla (Bonn, Universität, Bonn, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 16-21 11 refs In German

Investigation of the effect of flight stress evoked in Starfighter pilots upon the blood clotting stabilization in order to determine whether the flight stress might be hazardous to the pilot in case of an accident. The test procedure is described, and the results obtained are presented and analyzed. It is concluded that no change was observed in the number of thrombocytes as a result of flight stresses under consideration, and the medium thrombus reaction activity also remains mostly unchanged. O H

A70-23006 Stress and flying from the point of view of the air force physician (Stress und Fliegen aus der Sicht des Fliegerarztes) H Titus In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 22-26 5 refs In German

Discussion of the admissible degree of the pilot flight stress not resulting in hazardous consequences, and possible measures which should be taken in the air force to relieve this stress. Based on several actual examples, the danger of overcharge and fatigue of jet pilots is discussed. It is demonstrated that these symptoms in most cases result in longer reactions, decreased attention and performance, and panic. Several measures are suggested to increase the resistance of the flying personnel to psychic and flight stress. O H

A70-23007 Vibration and its effects upon man in air traffic (Vibration und ihre Wirkung auf den Menschen im Flugbetrieb) J Garbe (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 27-32 In German

Discussion of different vibrations and vibration sources in air traffic, and their influence upon human organs and sensations. A detailed survey is presented of different high and low frequency vibrations generated in aircraft and their characteristics. The stressing physiological effects of these vibrations upon the nervous system, heart and blood circulation, lungs, eyes, and muscles are then discussed, and the resulting human sensations are analyzed. O H

A70-23008 Air accidents over sea and survival on sea (Flugunfälle über See und Überleben auf See) A Wentrup (Bundesministerium der Verteidigung, Marine, Kiel, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 33-40 In German

Discussion of the possibilities of survival on sea following an air accident, based primarily on medical and technical considerations. A survey of existing rescue devices, particularly life-jackets, is presented. The principal dangers resulting from air accidents over sea, including death of drowning, undercooling, thirst, hunger, and physical exhaustion, are discussed in detail, and appropriate measures for their prevention are suggested. O H

A70-23009 The importance of telemetry for detection of stress situations (Die Bedeutung der Telemetrie für die Erfassung von Stress-Situationen) R O Amendt (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 41-47 In German

Discussion of present time techniques of recording biological reactions by means of radio telemetry. Most recent methods of detecting, transmitting, and evaluating data obtained in investigating physiological reactions of aircraft pilots subjected to different stress situations are explained, and the design and modes of operation of a highly effective device which can be used for large-scale measurements is described. O H

A70-23010 Heart frequency during parachute jumps (Herzfrequenz bei Fallschirmsprungen) H Renemann, Ph Beckhove, and H Roskamm (Freiburg, Universität, Freiburg im Breisgau, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 48-53 10 refs In German

Investigation of psychical and physical stresses of persons during parachute jumps by measuring their heart frequency responses by means of electrocardiograms recorded directly and telemetrically. Characteristic curves of heart frequencies recorded in this manner during the successive jump stages, the so-called heart frequency profiles which clearly demonstrate moments of psychophysic stress, are obtained, discussed and analyzed. O H

A70-23011 Stress and blood pressure behavior (Stress und Blutdruckverhalten). B Herter (München, Technische Hochschule, München, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 54-58 In German

Investigation of mechanisms responsible for blood pressure variations and, in particular, resulting in permanent irreversible hypertonia in air force pilots subjected to repeated stress situations and acute emotional irritations. Biological processes of blood circulation are discussed, and several aspects contributing to blood pressure problems, particularly those originated by long lasting stress situations, are analyzed. O H

A70-23012 Psychic stress causing factors and psychic stress reactions (Psychische Stressoren und psychische Stress-Reaktionen) K Gerbert and B Falkenberg (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 59-71 15 refs In German

Discussion of psychic stress giving particular attention to stress causing factors to which aircraft pilots are subjected during the performance of their duties. Important harmful effects of psychic stress on the organism are examined. Various types of stress reactions are considered. The particular stress causing factors to which pilots are subjected are investigated. It is pointed out that pilots for propeller aircraft and helicopters are less subjected to syndromes caused by stress than pilots of jetpropelled aircraft. G R

A70-23013 Measures for the preservation of stress tolerance (Massnahmen zur Erhaltung der Stress-Toleranz) H W Kirchhoff (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 72-79 7 refs In German

Discussion of measures designed to maintain the fitness of aircraft pilots under the stress to which they are subjected. The ability of the organism to withstand stress up to a certain limit is examined. The main factors leading to coronary afflictions are considered taking into consideration smoking, overweight, lack of exercise and factors causing chronic stress to which especially pilots of jetpropelled aircraft are subjected. Periodic medical examinations and other measures are proposed to keep aircraft pilots in good physical condition. G R

A70-23014 Training for keeping fit (Konditionstraining) A Drews (Kursanatorium, Mettnau, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 80-85 21 refs In German

Discussion of program of physical exercise designed to maintain aircraft pilots in an optimal state of fitness. The harmful effects on pilots which are caused by nervous and psychic strains and by lack of exercise during the performance of their professional duties are pointed out and the need to counteract these effects by a balanced program of various types of physical exercise is discussed. A minimal program of exercise for a time of 10 min per day or for a time of 30 min twice or three times a week is recommended. G R

A70-23015 Type and amount of the body training for maintaining the physical fitness of a pilot (Art und Dosierung des Körpertrainings zur Erhaltung der körperlichen Leistungsfähigkeit des Piloten) M Anlauf (Ruhr Universität, Bochum, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 86-89 In German

Discussion of the type and amount of the physical training, taking into consideration the age and physiology of the pilot. A review is made of the literature data concerning the effects of the training type and its amount on the various physiological functions and physical fitness of human subjects. It is concluded that the minimum training time may not be changed up to the age of 60. However, the selected average pulse frequency during training must be lower after the age of 40 because the maximum attainable pulse frequencies decrease with the age. Z W

A70-23016 Flight safety as a military and medical problem—Discussion between a flight surgeon and a flight safety officer (Flugsicherheit, ein militarisches und medizinisches Problem—Gespräch zwischen einem Fliegerarzt und einem Flugsicherheitsoffizier) J Garbe (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) and W Peterle (Bundesministerium der Verteidigung, Höhere Technische Schule, Neubiberg, West Germany) In Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin) (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 90-94 In German

Discussion of the need of a cooperation between the air safety

service and the flight surgeons in the prevention of aircraft accidents. It is pointed out that the human factors are responsible for over 60% of aircraft accidents. It is concluded that the most important duty of a flight surgeon is to analyze the physiological and physiology-dependent factors which might be possible causes of aircraft accidents. The data collected should be used for eliminating these factors and preventing similar accidents. Z W

A70-23017 **Hyperbaric oxygenation—Treatment of oxygen overpressure (Hyperbare Oxygenation—Sauerstoffüberdruckbehandlung)** Armin Wandel (Bundesministerium der Verteidigung, Schiffahrtsmedizinisches Institut, Kiel, West Germany) In *Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin)* (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 95-107. In German

Description of the physiology and techniques for a hyperbaric oxygenation treatment. Special attention is given to the limitations of this treatment and equipment currently used. A discussion is presented of the advantages and drawbacks of the available chambers for hyperbaric oxygenation. Z W

A70-23018 **The problem of identification in a flying accident (Zum Problem der Identifikation beim Flugunfall)** S Krefft (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Furstenfeldbruck, West Germany) In *Stress in flight and current problems of flight medicine (Stress und Fliegen sowie aktuelle Probleme der Flugmedizin)* (A70-23002 09-05) Edited by H W Kirchhoff Darmstadt, Wehr und Wissen Verlagsgesellschaft (Wehrdienst und Gesundheit Volume 16), 1968, p 108-117. 14 refs. In German

Discussion of problems in the identification of victims in accidents involving aircraft and of ways for overcoming these problems. The importance of identifying the victims in such accidents is discussed. Various methods are described by which the identification can be effected taking into consideration the use of laboratories specializing in certain types of investigations in problem cases. G R

A70-23061 **Ultrastructure of intercellular junctions in adult and developing cardiac muscle** N Scott McNutt *American Journal of Cardiology*, vol 25, Feb 1970, p 169-183. 69 refs. NIH Grant No. CA-07368, PHS Grants No. GM-06729, No. GM-406TG

Review of the ultrastructural appearance of the intercalated disk taking into account three types of junctional specializations. The three types are the macula adherens, fascia adherens and nexus. Maculae and fasciae adherentes form the area of strong adhesion between adjacent cells. Their substructure is quite similar in some species. However, the thin actin filaments invariably insert into the fascia adherens, a feature particularly evident early in cardiogenesis when few myofibrils are present. The nexus is a region where the membranes of adjacent cells are physiologically and anatomically in contact, probably providing for electrical coupling of adjacent cells. G R

A70-23111 **Study of the QB1 interval and of the duration of the isometric left ventricle contraction in the normal adult (Etude de l'intervalle QB1 et du temps de contraction isométrique du ventricule gauche chez l'adulte normal)** J Pernod, R Carre, J Kermarec, and G Haguénauer *Revue de Médecine Aeronautique et Spatiale*, vol 8, 4th Quarter, 1969, p 167-170. 13 refs. In French

Analysis of the different phases of cardiac contraction performed upon 200 normal male subjects ranging in age from 19 to 30. The equipment and techniques used are described. The results, displayed in tables and diagrams, are compared with previously published data and discussed. M V E

A70-23112 **Resistance of the human body to high accelerations of short duration—Mechanical and hemodynamic effects (Résistance du corps humain aux accélérations élevées de courte durée—Effets mécaniques et hémodynamiques)** R Auffret, J Demange, R P Delahaye (Ministère des Armées, Service de Santé des Armées, Paris, France), and H Seris *Revue de Médecine Aeronautique et Spatiale*, vol 8, 4th Quarter, 1969, p 171-173. 12 refs. In French

Evaluation of human tolerance to accelerations of 15 g over a duration of nearly 0.8 sec by means of experiments conducted on a centrifuge. Stresses of this magnitude and duration may be entailed in low-altitude pilot rescue attempts by ejections from rapidly descending aircraft. Test results show no occurrence of peripheral or central vision trouble or of syncope. Observed vertebral pain syndromes are attributed to wrong body position at departure. M V E

A70-23113 **Realization and biological action of hypomagnetic environments (Realisation et action biologique des ambiances hypomagnétiques)** G Deltour (Centre d'Enseignement et de Recherches de Médecine Aeronautique, Paris, France), A Pfister (NATO, AGARD, Brussels, Belgium), and L Miro *Revue de Médecine Aeronautique et Spatiale*, vol 8, 4th Quarter, 1969, p 175-177. 9 refs. In French

Review of published information on laboratory methods of geomagnetic field suppression and on biological effects of exposure to low magnetic fields. The reviewed material is essentially of U.S. origin and includes Beischer and Miller's work with human subjects (1962 and 1967) and Conley's (1966) and Halpern's (1966 and 1967) work with mice, plants, and microorganisms. M V E

A70-23114 **The advantage of using radiology after an air accident (in connection with a fatal supersonic ejection) (De l'intérêt de l'emploi de la radiologie après accident aérien /a propos d'une éjection supersonique mortelle/)** M Chiris, R Jouffroy, R Favier, H Seris, R Auffret, J Borsarello, and R P Delahaye *Revue de Médecine Aeronautique et Spatiale*, vol 8, 4th Quarter, 1969, p 179-183. In French

Investigation of the circumstances of a fatal air accident involving supersonic ejection from a Mirage III E fighter plane. The investigation made possible an accurate determination of the pathogenic mechanism of the various injuries observed. This was made possible through correlation of the dead pilot's clinical examination and radiography data with the results obtained from simulation studies, computer calculations and inspection of the ejected seat. A systematic application of radiography in investigations of air accidents is felt worth recommending. M V E

A70-23115 **Color perception examination of flight personnel (L'examen du sens chromatique du personnel navigant)** J Chevaleraud (Ministère des Armées, Hôpitaux des Armées, Paris, France) and G Perdriel *Revue de Médecine Aeronautique et Spatiale*, vol 8, 4th Quarter, 1969, p 185-188. In French

Review of color perception flight requirements and anomaly detection methods. Color signal uses customary in aircraft and airport flight control practice are briefly summarized. Hereditary and acquired color perception anomalies and the test methods and equipment used for their detection are reviewed and discussed. M V E

A70-23131 # **Visual illusions in flight (Zritel'nye illyuzii v polete)** I Kamyshev and V Lazarev *Aviatsia i Kosmonavtika*, Jan 1970, p 37, 38. In Russian

Discussion of illusory visual signals experienced by pilots under conditions where aerodynamic forces disturb the normal functional relationships between sensory systems. An example of visual illusions is analyzed in a case where a change in a helicopter flight formation at night caused one pilot to disregard his instrument horizon reading. Experiments where pilots were asked to maintain proper aircraft

attitudes without the benefit of instrument readings are analyzed. Methods of counteracting the effects of illusions are discussed, and the effectiveness of pilot training is evaluated. T M

A70-23148 # Chimkurgan reservoir algae (Al'goflora Chimkurganskogo vodokhranilishcha) A E Ergashev (Akademiya Nauk Uzbekskoi SSR, Institut Botaniki, Tashkent, Uzbek SSR) *Uzbekskii Biologicheskii Zhurnal*, vol 13, no 4, 1969, p 40-42. In Russian

Summary of the physicochemical characteristics and description of the plant life of the Chimkurgan reservoir. The number of species of algae present at any time varies with the ecological changes of each season and amounts approximately to 152 in spring, 213 in summer, 169 in autumn, and 104 in winter. The total number of various species whose presence has been observed is 269. Differences in the specific plant life composition between central parts and coastal areas of the reservoir are pointed out. M V E

A70-23149 # X-ray structural and electrophoretic investigation of the protein components of donor and fibrinolytic blood (Rentgenostrukturnoe i elektroforeticheskoe issledovanie belkovykh komponentov donorskoi i fibrinoliznoi krovi) S V Sovetkin, Z A Belikova, E V Borovkova, M S Sabirov, and L D Nurullaev (Uzbekskii Nauchno-Issledovatel'skii Institut Gematologii i Perelivaniya Krovi, Tashkent, Uzbek SSR) *Uzbekskii Biologicheskii Zhurnal*, vol 13, no 5, 1969, p 11-13. In Russian

Study of the structural peculiarities of the individual components of donor and fibrinolytic blood. The investigation results show that donor and fibrinolytic blood have common structural elements. The transition from crystalline to amorphous structure was observed in the course of blood serum and plasma lyophilization. The original structure is recovered upon dissolution of the lyophilized blood serum or plasma. M V E

A70-23150 # Blood-protein bound iodine during radiation sickness (Sviazannyi s belkom iod krovi pri luchевой bolezni) Ia Kh Turakulov and N Kh Abilaeva (Akademiya Nauk Uzbekskoi SSR, Institut Biokhimii, Tashkent, Uzbek SSR) *Uzbekskii Biologicheskii Zhurnal*, vol 13, no 5, 1969, p 53. In Russian

Investigation of the thyroid gland function following radiation injury of the organism. The method used consisted in measuring the plasma-protein bound iodine in the blood of irradiated rats. The results indicate a direct dependence of the repression of the thyroid gland function on the seriousness of the radiation sickness. The considerable reduction in protein bound iodine coincides significantly with the rise in the death rate of the irradiated rats. M V E

A70-23267 An electromagnetic flowmeter for studying changes of cardiac output in unanaesthetized rats. C Browning, J M Ledingham (London Hospital, London, England), and D Pelling *Medical and Biological Engineering*, vol 7, Sept 1969, p 549-558. 19 refs

An electromagnetic flowmeter is described which has been designed for the determination of cardiac output changes in the unanaesthetized rat, over a period of weeks. The construction and form of the implanted flow probe and associated electronic equipment are discussed, together with their limitations and main sources of error. To establish the validity of the method, comparisons are made of the flowmeter output with a standard method in *in vitro* and *in vivo* tests. The results of these comparisons have shown a linear relationship between the flowmeter readings and absolute values of flow rate. Furthermore, they show a difference between *in vitro* and *in vivo* sensitivity of the probe, the reasons for which are discussed. (Author)

A70-23301 The serological abnormalities of idiopathic myocardial disease. John A Robinson, Hans G Griebel, and Truman

O Anderson (Illinois, University, Cook County Hospital, Chicago, Ill.) *Cardiovascular Research*, vol 4, Jan 1970, p 14-22. 44 refs. NIH Grant No HE-09 666

Seventy-three patients with idiopathic myocardial disease were investigated for markers of immunopathology. Abnormalities included hypoproteinaemia (13%), hypergammaglobulinaemia (43%), elevated complement (78%), rheumatoid factor (44%), anti-tissue (16%) and anti-striated muscle (20%) antibodies, biological false positive tests for syphilis, transient reactors 44%, chronic 13%. The results were interpreted as immunological consequences of myocardial destruction rather than causative phenomena. (Author)

A70-23302 A technique for estimation of intramyocardial pressure in acute and chronic experiments. J J van der Meer, R S Reneman, H Schneider, and J Wieberdink (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) *Cardiovascular Research*, vol 4, Jan 1970, p 132-140. 32 refs

An improved technique for intramyocardial pressure measurement is described. With this technique it is possible to measure diastolic and systolic values *in acute* as well as in chronic experiments. The reliability of this technique was tested in *in vitro* and *in vivo* experiments. (Author)

A70-23378 Decay and interference effects in the short-term retention of a discrete motor act. Ross L Pepper and Louis M Herman (Hawaii, University, Honolulu, Hawaii) *Journal of Experimental Psychology, Monograph Supplement*, vol 83, Feb 1970, p 1-18. 28 refs

Measurement of the short-term retention of force responses, the dependent variables being the absolute and algebraic errors made by a subject in attempting to reproduce a criterion force during recall trials. Four experiments are described, all of which were characterized by overshooting response sets (positive algebraic errors) at recall. A dual process theory of motor short-term memory (STM) incorporating decay and interference features is advanced to account for the set of findings, and similarities with dual process theories of verbal STM are noted. F R L

A70-23399 * Variation in fasting and postprandial amino acids of men fed adequate or protein free diets. Lee Alyce Weller, Sheldon Margen, and Doris Howes Calloway (California, University, Berkeley, Calif.) *American Journal of Clinical Nutrition*, vol 22, Dec 1969, p 1577-1583. 29 refs. Grant No NGR-05 003-068

Examination of the fasting and postprandial serum amino acid patterns of healthy men fed precise formula diets containing either an adequate amount or no protein. It is found that variation on serum levels was as large as within an individual as between subjects fed the same diets. Serum amino acid patterns appear to be more characteristic of diet than of short-term nutrition status. Z W

A70 23437 * Influence of feeding habits and adrenal cortex on diurnal rhythm of hepatic tyrosine transaminase activity. Clarence Cohn, Dorothy Joseph, Frances Larin, William J Shoemaker, and Richard J Wurtman (Michael Reese Hospital, Chicago, Ill., MIT, Cambridge, Mass.) *Society for Experimental Biology and Medicine Proceedings*, vol 133, Feb 1970, p 460-462. 13 refs. Research supported by the Thomas J Lipton Foundation, PHS Grants No AM 00193, No AM 11709. Grant No NGR-22 009-272

Experimental investigation of the effect of dietary intake and adrenal cortex on the diurnal rhythm of hepatic tyrosine transaminase activity. The amplitude of the 24-hr rhythm in hepatic tyrosine transaminase activities of rats fed hourly was markedly reduced when compared to the activities of the enzyme in rats eating *ad libitum*. Reversing the lighting schedule reversed the rhythms but did not change their amplitudes. Hourly feedings did not influence the cyclicity of the corticosterone content of the adrenal. It is concluded that rhythms in food ingestion and adrenal cortical secretions play roles in the generation of the rhythmicity of hepatic tyrosine

transaminase activities but that the diurnal variation in adrenal corticosterone content is not related to the cyclicity of food intake
M M

A70-23439 # Weightlessness—Its physiopathological effects (La 'non-pesanteur'—Ses effets physiopathologiques) G Chatelier and A P Gibert (Ministere des Armees, Service de Sante des Armees, Paris, France) *Revue des Corps de Sante des Armees* vol 10, Dec 1969, p 761-781 24 refs In French

Examination of the physiopathological effects of weightlessness, defined as the apparent absence of weight within a system. At present, it appears that no major difficulties may be expected. For short flights (up to 14 days), the selection and training of astronauts seems to be sufficient to counterbalance anticipated problems. For long flights, the total dislocation of the sleep-wake rhythm may create serious nutritional and behavioral problems. Further, lowering of skeletal calcium and muscular nitrogen content appears to be linear as a function of time. If no adaptation mechanism halts this elimination, there is a risk of osteoporosis and amyotrophy. It would therefore be desirable to establish partial gravity in a spacecraft intended for long voyages by imparting rotation to it
F R L

A70-23454 Tilt tolerance of young men and young women Esar Shvartz and Naomi Meyerstein (Negev Institut for Arid Zone Research, Beersheba, Israel) *Aerospace Medicine*, vol 41, Mar 1970, p 253-255 15 refs Research supported by the Ministry of Education and Culture

A 20-minute tilt table test was given to 18 young men and 18 young women. One man and one woman fainted during the test. Both groups showed similar orthostatic responses. Although the women had higher orthostatic heart rates and lower orthostatic blood pressure values than the men, this was attributed to similar sex differences found in recumbency
(Author)

A70-23455 Physiological cost of piloting rotary wing aircraft Charles E Billings, Robert Bason, and Ralph J Gerke (Ohio State University, Columbus, Ohio) *Aerospace Medicine*, vol 41, Mar 1970, p 256-258 Army supported research

Two experienced and two inexperienced pilots flew Hiller 12-E and 12-EL helicopters through a series of standard maneuvers. Metabolic and heart rates were determined during each maneuver. Heart rates were significantly lower in the 12 EL, which has boosted controls, though metabolic rates were virtually identical in the two aircraft. There were no significant differences between the experienced and inexperienced pilots in either helicopter, even though the latter had not previously flown the 12-EL. The highest metabolic rates, during hovering maneuvers, approximated twice resting (seated) values. These metabolic levels were accompanied by heart rates in the neighborhood of 100/minute both in flight and during mild exercise on the ground
(Author)

A70-23456 * Reduction of urinary precipitates through manipulation of diet in *Macaca nemestrina* R M Durham, Rafael Tejada, Mary Parker, and A T K Cockett (California, University, Los Angeles, Calif) *Aerospace Medicine*, vol 41, Mar 1970, p 259-263 5 refs Contract No NAS 2-2503

Pig-tail Macaques fed a diet of cereal grains consistently produced urine of a high (8.0-9.0) pH, with considerable calcium ppt present. When the protein and carbohydrate source was changed to casein and sucrose respectively, the urine pH dropped within 24 hours to a point well into the acid range, and insoluble precipitates vanished. This phenomenon made possible the launch into space of a monkey of this species in NASA's Biosatellite D spacecraft, with reasonable hope of success. Early tests showed that the precipitates, which were primarily calcium phosphates and carbonates, were collecting in and plugging conduits carrying urine from the animal to a waste container
(Author)

A70-23457 Pure-tone air conduction audiogram Vernon C Bragg (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aerospace Medicine*, vol 41, Mar 1970, p 264-268

Although the air conduction audiogram alone does not provide sufficient information for diagnosis in hearing loss cases, it usually gives an indication as to whether the loss is conductive or sensorineural in origin. This information is essential to the proper handling of patients, particularly those who may be exposed to intense noises. A method for interpretation of audiometric contours is given, followed by a step-by-step procedure for analyzing the pure tone audiogram. In addition, recommendations are made concerning the handling of patients whose audiograms fall outside normal limits. Utilization of these procedures within a comprehensive program of hearing testing, noise control, and education has been found to constitute a successful hearing conservation program wherever personnel work in hazardous noises. The analysis technique should also be helpful in dealing with various types of hearing losses in many situations. A chart, Key to Interpretation of the Pure Tone Air Conduction Audiogram, provides a quick reference to patient disposition
(Author)

A70-23458 * Automatic cooling in water cooled space suits Paul Webb, Samuel J Troutman, Jr, and James F Annis (Webb Associates, Yellow Springs, Ohio) *Aerospace Medicine*, vol 41, Mar 1970, p 269-277 21 refs Contracts No NASw 1306, No NASw 1529, No NAS1-2682

Water cooling in space suits is a powerful means of extracting metabolic heat, so effective that a man can be overcooled even when working hard. The problem is how to control the cooling. Manual control by the subject has been used but man is a poor judge of his own thermal state and often reacts too late or too strongly. Automatic control based upon physiological changes is discussed in this paper for astronauts who might work hard during extravehicular activity while relying on water cooling to prevent heat accumulation and sweating in space suits
(Author)

A70-23459 Accidental decompression—A new philosophy for the transports of the 1970's A Peter Holm, T Freedman, and A Puskas (North American Rockwell Corp, Aerospace and Systems Group, Downey, Calif) *Aerospace Medicine*, vol 41, Mar 1970, p 277-282 21 refs Contract No AF 33(600)-38669

The rationale for personnel protection against accidental decompression in transport aircraft that will be operating in the 1970 decade is reviewed. Data pertinent to manned and simian tests that were conducted in conjunction with the B 70 program is presented in context with a review of the literature dealing with the effects of rapid decompression to altitudes of 45,000 feet and above. The results of these findings indicate a need for additional protection for flights in this region and questions the use of oxygen masks for contingencies above 35,000 feet. Potential alternatives which would augment aircrew protection are discussed in terms of feasibility and the physiological characteristics of the existing pilot inventory. A recommendation is made to provide flight stations with a capsule which would rapidly achieve a ground level oxygen equivalent upon decompression warning and be equipped for flydown to an altitude where demand oxygen equipment can safely be utilized
(Author)

A70-23460 # Intraocular pressure and retinal responses of dogs at 45,000 and 80,000 feet Julian P Cooke (USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aerospace Medicine*, vol 41, Mar 1970, p 283-289 41 refs

Intraocular pressure changes and retinal observations, along with cardiovascular pressure measurements, were made during and after decompression of both conscious and anesthetized dogs from 10,000-ft altitude, while breathing either air or oxygen to pressures that might be encountered in supersonic or high performance aircraft if cabin pressure were lost. Decompressions were made within either 1 min (slow) or 1 sec (rapid), and exposures lasted 2 min. When air had been breathed, intraocular pressure almost doubled during slow

decompressions to 45,000 ft, and almost tripled in value at 80,000 ft. No increase was measured during the 45,000-ft exposure in which oxygen was breathed, but during the 80,000-ft exposure intraocular pressure doubled when oxygen had been breathed. Fast decompressions resulted in slightly higher values. Soon after recompression to ground level pressure, intraocular pressure increased to slightly higher values than those measured during the exposure. Bubbles were never observed in the aqueous humor. Some retinal blanching occurred during exposure when intraocular pressure was elevated. A flame-type hemorrhage was seen infrequently. Although peripheral vision will likely be reduced, it is reasoned that changes observed during exposures at 45,000 ft are not generally of sufficient magnitudes to prevent the successful completion of a mission before vision is lost with unconsciousness. Exposure to 80,000 ft, however, especially with air, may cause temporary visual impairment that lasts for a few minutes after consciousness is regained. Safe recovery is contingent, however, on an immediate recompression to a safe pressure. (Author)

A70-23461 Miniature pig incapacitation and performance decrement after mixed gamma-neutron irradiation. R L Chaput and D Wise (U.S. Armed Forces Radiobiology Research Institute, Bethesda, Md.) *Aerospace Medicine*, vol 41, Mar 1970, p 290-293. 7 refs

The ability of trained miniature pigs to traverse a two-chambered shuttlebox was evaluated after they received midline tissue doses of pulsed, mixed gamma neutron radiations ranging from 1000 to 14,700 rads. At 2400 rads or more, most pigs were almost immediately incapacitated with severe convulsions. At doses of 2400 and 5000 rads the animals began to recover and perform after a few minutes when the convulsions subsided. At higher doses, most animals became comatose and did not begin to recover until 15 to 50 minutes postirradiation. After recovering the pigs worked for a time at relatively normal levels. Later their performance degenerated, and the pigs became permanently incapacitated a few hours before death. At doses of 7600 rads and higher, some of the animals recovered only partially before becoming permanently incapacitated, and at 13,200 rads or more, most animals were permanently incapacitated immediately after irradiation. (Author)

A70-23462 Effects of bending on the vertebral column during +G sub z acceleration. A P Vulcan (Weapons Research Establishment, Aeronautical Research Laboratories, Melbourne, Australia), A I King, and G S Nakamura (Wayne State University, Detroit, Mich.) *Aerospace Medicine*, vol 41, Mar 1970, p 294-300. 9 refs. PHS Grant No. UI 00056-09

Fractures of vertebrae are still common during ejection from military aircraft. The majority of fractures occur between T8 and L1. Experiments were conducted on the vertical accelerator using seated human cadavers. Strain gages were installed on the anterior and lateral aspects of the vertebral bodies in order to assess the relative importance of bending and axial compression. The existence of significant bending stresses has been established. It is shown that these high bending stresses are caused by the forward rotation of the head and torso. Various restraint systems and seat back configurations were investigated. The results show that bending strains can be reduced by increasing shoulder strap pre-tension and by leaning the seat-back rearwards. It is suggested that future models predicting vertebral injury of the seated human subjected to caudocephalad acceleration should take into account forward flexion of the head and torso and the effects of external restraints. (Author)

A70-23463 Analysis of visual search activity in skilled and novice helicopter pilots. John A Stern and James A Bynum (Washington University, St. Louis, Mo.) *Aerospace Medicine*, vol 41, Mar 1970, p 300-305. Army supported research.

Eye movements in both the horizontal as well as vertical plane and eye blinks were recorded in 13 skilled and 13 unskilled pilots

while flying the UH-1D helicopter during a cross-country flight of approximately 50 minutes duration. Saccadic eye movements in both the horizontal and vertical plane were evaluated. The results demonstrate that skilled pilots engage in significantly more visual search activity in the horizontal plane than is true of novice pilots. Both skilled and unskilled pilots demonstrate changes in visual search activity as a function of time on task. These changes include a decrease of searching in the horizontal plane, a decrease in searching in the vertical plane, an increase in the amount of time not engaged in search activity per unit time, and a decrease in blink rate. These results are interpreted as suggesting a decrease in visual search activity as a function of time-on task. (Author)

A70-23464 # Consumption of rehydratable food in zero-gravity environments using conventional eating utensils. John E Vanderveen, May J O'Hara, and Donald A Leeb (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) *Aerospace Medicine*, vol 41, Mar 1970, p 306-308. 6 refs

Consumption of food using conventional spoons and forks was investigated in a weightless environment aboard an NF-100F Aircraft. The foods which were tested included entrees, soups, fruits and vegetables, either fresh, precooked frozen, precooked wet packaged, rehydrated freeze-dried, reconstituted dehydrated or canned. All foods with the exception of whole peas were consumed without contaminating the atmosphere of the aircraft. Whole peas required a cream sauce for reliable manipulation with a spoon in the Zero 'G' environment. It was demonstrated that the interfacial tensions between water and the food, containers, and utensils provide sufficient adhesion to retain food on the eating utensil during transfer from the food container to the subject's mouth. (Author)

A70-23465 Sensory motor adaptation and after-effects of exposure to increased gravitational forces. Malcolm Martin Cohen (U.S. Naval Material Command, Naval Air Development Center, Johnsville, Pa.) *Aerospace Medicine*, vol 41, Mar 1970, p 318-322. 13 refs. Navy-supported research.

Eight subjects were exposed to accelerative forces of 2-g in the z axis in the Naval Air Development Center human centrifuge facility. Samples of hand eye coordination were examined both during and after exposure. While exposed to this acceleration environment, subjects initially reached below, and then, above, a mirror viewed target. When the accelerative forces were removed, transient after-effects were observed in which subjects reached still further above the target before they returned to baseline levels of accuracy. The after effects resulted only when the subjects had an opportunity to make reaching movements while they were exposed to the increased accelerative forces. Where present, the after-effects were observed for both arms. The data suggest that the relationship between intended motor outputs and their proprioceptive-kinaesthetic consequences provides adequate information for rapid behavioral compensation and adaptation to altered accelerative forces. Further, vestibular and/or sensory-tonic factors are implicated in bringing about changes in the apparent elevation of targets viewed under increased accelerative forces. (Author)

A70-23467 # Potentials of the Aeromedical Evacuation System in the overall treatment process for the seriously ill patient. J P McCann, J R Burnett (General Dynamics Corp., San Diego, Calif.), and F M G Holmstrom (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) *Aerospace Medicine*, vol 41, Mar 1970, p 323-328. Contract No. AF 41(609)-67-C 0102

A study of the worldwide Aeromedical Evacuation System included an evaluation of the potential of the AES in the overall treatment of the seriously ill patient. The findings relevant to this portion of the study were based on (1) analysis of specific case histories of seriously ill patients involved in various treatment plans, each of which included air evacuation operations, (2) the application of techniques to grossly calculate the relative stress on the patient

imposed by various treatment and evacuation alternatives and their application to determinations of optimum treatment plans where air evacuation is available, and (3) analysis of trends and the probable influence of new developments in medical treatment, medical equipments, air transport, and the military civilian interfaces in the exploitation of air ambulances and specialty treatment centers. A brief description of the study program and some of its findings pertinent to the topic are presented. The study, conducted by a multi-disciplined team comprised of medical, operational, and engineering personnel, included first-hand observations of the AES covering in excess of 100,000 miles of evacuation routes throughout the worldwide system and interviews with over 150 authorities.

(Author)

A70-23468 **Wolff-Parkinson-White syndrome simulating myocardial infarction** J E Smith, C R Harper, and G J Kidera (United Air Lines, Inc., Washington, D C.) *Aerospace Medicine*, vol 41, Mar 1970, p 328-330 10 refs

During a routine company prescribed physical examination, a 50-year-old airline captain was found to have an abnormal resting electrocardiogram and a positive post exercise Master two-step test. Previous ECG's taken annually over a period of 18 years were normal. Reexamination showed a reversion to normal with a normal exercise electrocardiogram. It was decided that this case was an unusual type of Wolff-Parkinson-White syndrome and was not related to coronary heart disease. From an analysis of the literature, and our experience with this case, it is likely that exercise electrocardiograms in the presence of Wolff-Parkinson-White type of accelerated conduction, have no diagnostic value because of the frequency of false positive tests.

(Author)

A70-23469 **Flight-deck vision of professional pilots** R D Watkins (Melbourne, University, Melbourne, Australia) *Aerospace Medicine*, vol 41, Mar 1970, p 337-342 23 refs

Alterations to the near visual acuity requirements for professional pilots are recommended, and the reasons for these proposed alterations are discussed. The factors which influence the power and type of lens chosen for flight deck use by a presbyopic pilot are presented, particular reference being made to the range of distances over which the main instrument panel should appear clear rather than the single distance usually considered. The possibilities of ophthalmic correction for the overhead panel are briefly examined and are concluded to be less satisfactory than a human factors engineering solution.

(Author)

A70-23470 # **Aeromedical consultation service case report—Post-traumatic epilepsy** Earl A Zimmerman and Timothy N Caris (USAF, School of Aerospace Medicine, Brooks AFB, Tex.) *Aerospace Medicine*, vol 41, Mar 1970, p 343, 344 8 refs

Two cases of head injury complicated by subdural hematoma were referred to the USAF School of Aerospace Medicine seventeen months and two years post-surgery for aeromedical evaluation. In one, persistent focal central spikes and, in the other, a seizure after sleep deprivation precluded return to flying. These two high-risk factors for post traumatic epilepsy (subdural hematoma and focal spike EEG abnormality) are reviewed.

(Author)

A70-23546 **Effects of plasma viscosity and aggregation on whole-blood viscosity** Peter W Rand, Nancy Barker, and Eleanor Lacombe (Maine Medical Center, Portland, Me.) *American Journal of Physiology*, vol 218, Mar 1970 p 681-688 30 refs PHS Grant No HE-07984-07

We have found that the hyperviscosity of aggregated blood is strongly dependent on the level of plasma viscosity. To evaluate this effect, viscosity and aggregation studies were performed on artificially aggregated blood samples with normal plasma viscosity, on pathologically aggregated samples in which plasma viscosity was

reduced to normal levels, and on normal samples in which plasma viscosity was increased. An observation chamber was devised for comparative studies of erythrocyte aggregation. The studies demonstrate that if plasma viscosity is maintained within normal limits, the viscosity of blood, above a shear rate of 11 per sec, is unaffected by the degree of aggregation, whether artificially or naturally produced. They further indicate essentially no difference in the effect of plasma viscosity on blood viscosity between samples containing normal proteins and those containing abnormal proteins. The implications of these findings are discussed. It is apparent that the influence of plasma viscosity must be considered in the future investigations relating aggregation to blood viscosity. (Author)

A70-23547 **Mechanical interaction between longitudinal and circular axes of the small intestine** J D Wood and W E Perkins (Illinois, University, Urbana, Ill.) *American Journal of Physiology*, vol 218, Mar 1970, p 762-768 25 refs PHS Grant No GM-619, NSF Grant No GB 4005

Transmural stimulation elicited contractile responses in the circular axis which consisted of phasic and tonic components. Contraction of the circular axis was accompanied by a relaxation in the longitudinal axis. Stimulus-induced relaxation in the longitudinal axis occurred in preparations devoid of longitudinal muscle and in the presence of nerve-blocking drugs. A decrease in the circumference of the circular axis, due to contraction of circular muscle, produced a length increase in the longitudinal axis. The increase in longitudinal length was proportional to the change in the circumference. Relaxation in the longitudinal axis was a mechanical consequence of circular muscle contraction rather than nervous inhibition of the longitudinal muscle. The phasic component of the circular response had a low stimulus threshold and fatigued rapidly during repetitive stimulation. The tonic response had a higher threshold and was not easily fatigued. Both components were unchanged in the presence of local anesthetics and depleted Na(+) but were reduced in lowered Ca(2+) and abolished by depolarization in high concentrations of K(+) (Author)

A70-23576 **Short-term visual restriction in visual and auditory discrimination** Robert G Gibby, Jr., Robert G Gibby, Sr., and John C Townsend (US Veterans Administration Hospital, Richmond, Va.) *Perceptual and Motor Skills*, vol 30, Feb 1970, p 15-21 16 refs

Determination of the effect of sensory restriction on perceptual thresholds. The experimental predictions were formulated from Lindsley's (1961) model of the reticular activating system (RAS). Attention was focused upon changes in the visual CFF threshold, loudness discrimination, and pitch discrimination as related to two levels of visual restriction. Subjects were 60 male volunteers. Statistical analysis included analysis of covariance followed by a priori group comparisons. Statistical support (p less than .05) was found for 3 of 4 general hypotheses. It was concluded that the RAS attempts to maintain cortical arousal at an optional level by regulating stimulus input. A reduction in this input apparently lowers perceptual thresholds in the sensory system restricted and other systems as well. (Author)

A70-23577 **Recovery of motor performance following startle** Richard I Thackray and R Mark Touchstone (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.) *Perceptual and Motor Skills*, vol 30, Feb 1970, p 279-292 21 refs

The present study was designed to provide information concerning the extent to which startle disrupts motor performance, the rate of recovery, and characteristics of Ss who differ in susceptibility to startle. 30 Ss were trained on both reaction time and tracking tasks. Continuous recordings were taken of heart rate and skin conductance. During a subsequent period of continuous tracking, 'startle' stimuli (115 db random noise) were unexpectedly presented. Results showed the recovery of tracking performance following startle to be quite rapid, performance returned to

pre-stimulus levels within 15 sec following stimulation. Contrary to several previous studies, reaction times to the startle stimuli decreased relative to nonstartle reaction times. Ss with the greatest increase in tracking error following startle were least proficient prior to startle. There was also an indication that these Ss reacted more strongly to startle, in terms of both their subjective response and heart-rate acceleration, than those Ss whose tracking was least impaired by startle. An apparent covariation between recovery curves for heart rate and tracking error was found following startle. (Author)

A70-23578 Estimation of intersection of two converging targets as a function of speed and angle of target movement. Kent A. Kimball (South Dakota, University, Vermillion, S. Dak.) *Perceptual and Motor Skills*, vol 30, Feb 1970, p 303-310 10 refs

Investigation of the effects of target velocity and angle of approach on the accuracy of intersection estimation of two moving targets. An inferred movement display was utilized in which two rows of lights, flashing serially across the display, simulated two moving targets. Five different target velocities and two angles of approach (30 and 90 deg) were used. The targets were displayed halfway to the actual intersection point. The subjects' task was to observe the targets until they disappeared and then indicate when he thought they intersected. Each subject was given 100 trials. Raw data in the form of the difference between estimated and actual intersection time were collected and converted to constant and absolute error scores for each trial. In three factor analysis of variance with repeated measures on two variables, target velocity and angle of approach were significant sources of variation. Second-order and third-order interactions between angle, speed, and subjects were also statistically significant. Time estimations were converted to velocity estimates, and standard deviations of estimates were plotted against mean velocity estimates. A linear function was obtained similar to that reported by Brown (1961). (Author)

A70-23583 Evidence of a cholinergic nervous mechanism mediating the autoregulatory dilatation of the cerebral blood vessels. George I. Mchedlishvili and Lia S. Nikolaishvili (Akademia Nauk Gruzinskoi SSR, Fiziologicheskii Institut, Tiflis, Georgian SSR) *Pflügers Archiv*, vol 315, no 1, 1970, p 27-37 33 refs

Autoregulatory dilatation and constriction of the pial arteries under conditions of changes in the systemic arterial pressure were studied in experiments with 38 adult rabbits (unanaesthetized or under light urethane anesthesia). These vascular responses disappeared after cerebral ischemia of 1 to 2 min duration (not because of reactive vasodilatation), and this seems to be more suggestive of a nervous rather than a muscular (i.e., caused by the Bayliss effect or by vasodilatory metabolites) mechanism. Intravenous administration of postganglionic cholinergic inhibitors (Atropine, Amizylum, 7351) resulted in disappearance of autoregulatory vasodilatation while vasoconstriction remained unchanged. Similar results were obtained when Amizylum and 7351 were locally applied to the cerebral surface. An experimental analysis proved the specificity of these effects of the drugs mentioned. The conclusion is that a nervous cholinergic mechanism is involved in the functional dilatation of the pial arteries under conditions of decreased blood supply to the cerebral cortex. (Author)

A70-23584 Mass spectrometric determination of the oxygen and carbon dioxide content of blood (Massenspektrometrische Bestimmung des O₂- und CO₂-Gehaltes von Blut). P. Lotz, H. Dahners, and J. P. Pichotka (Bonn, Universität, Bonn, West Germany) *Pflügers Archiv*, vol 315, no 1, 1970, p 86-92 5 refs. In German

Measurement of the fractions of carbon dioxide and oxygen washed out of a sample of blood by a carrier gas continuously by means of a respiration mass spectrometer. The integral of concentration over time is proportional to the quantity of gas washed out. Calibration is done by injection of known quantities of

oxygen and carbon dioxide into the carrier gas. The time necessary for one determination is 2 min. (Author)

A70-23585 Regulation of the coronary blood supply during acute lack of oxygen (Zur Regelung der Coronardurchblutung im akuten Sauerstoffmangel). Wolfgang Jühran and Karl Dietmann (Boehringer Mannheim GmbH, Mannheim, West Germany) *Pflügers Archiv*, vol 315, no 2, 1970, p 105-109 18 refs. In German

The coronary blood flow of 5 conscious dogs was recorded continuously with electromagnetic flowmeters. A temporary local hypoxia of the myocardium induced by means of a pneumatic blood vessel occluder was followed by a reactive hyperemia. Theophylline prevented the increase in coronary blood flow during adenosine infusion but not the reactive hyperemia. This shows that the latter is not caused by a release of adenosine. (Author)

A70-23586 The influence of hyperbaric oxygen on heart muscle contractility in warm-blooded animals—Guinea pigs (Der Einfluss hoher Sauerstoffdrucke auf die Kontraktilität des Herzmuskels des Warmblüters—Meerschweinchen). E. Rumberger, E. Retzlaff, and A. Bleichert (Hamburg, Universität, Hamburg, West Germany) *Pflügers Archiv*, vol 315, no 2, 1970, p 125-135 29 refs. In German

Investigation of the effects of high oxygen pressure on the myocardial function in mammals. The experiment results indicate that the heart's mechanical reaction to oxygen intoxication is twofold: (1) the contraction amplitude decreases, and (2) an irreversible state of maintained contraction (rigor) develops. The discussion of the results takes into account the known biochemical facts pertaining to the effect of hyperbaric oxygen on the enzymatic activity of cells and on substrate utilization. M. V. E.

A70-23587 The pressure rise velocity in the left ventricle as a measure of contractility under various hemodynamic conditions (Die Druckerstiegschwindigkeit im linken Ventrikel als Mass für die Kontraktilität unter verschiedenen hämodynamischen Bedingungen). C. Morgenstern, G. Arnold, U. Holjes, and W. Lochner (Düsseldorf, Universität, Düsseldorf, West Germany) *Pflügers Archiv*, vol 315, no 2, 1970, p 173-186 9 refs. In German

Investigation of the interrelations of intraventricular pressure rise rate with heart contractility and hemodynamics. Two mechanisms change the rate of intraventricular pressure rise: (1) hemodynamics, which changes the length of the muscle fiber, and (2) the contractile state of the fibers or the contractility of the heart. Change in contractility of the heart has a greater effect than hemodynamic changes on the maximum rate of intraventricular pressure rise. Heart rate has a small effect on the contractility of the heart. Coronary perfusion pressure and left ventricular end diastolic pressure have no effect on the time of peak rate of intraventricular pressure rise in the cardiac cycle. M. V. E.

A70-23626 Vectorcardiographic criteria for the diagnosis of left ventricular hypertrophy. Charles W. Abbott Smith and Te Chuan Chou (Cincinnati, University, Cincinnati General Hospital, Cincinnati, Ohio) *American Heart Journal*, vol 79, Mar 1970, p 361-369 19 refs. Research supported by the Heart Association of Southwestern Ohio and by the University of Cincinnati.

Study conducted to improve the vector cardiographic diagnosis of left ventricular hypertrophy (LVH) by defining criteria based on other QRS changes as well. They were determined by contrasting the VCG's of 200 normal subjects with those of 100 patients who had clinical evidence of pure LVH, and subsequently were tested on 100 consecutive autopsied cases. Voltage criteria were formed using the magnitude of the maximum QRS vector, while additional QRS criteria were developed using characteristics of the transverse plane QRS loop found in LVH. G. R.

A70-23692 Human poles and zeros Alexander N Landyshev (California State Polytechnic College, San Luis Obispo, Calif.) (Instrument Society of America, Annual Conference, 23rd, New York, N Y, Oct 28-31, 1968) *ISA Transactions*, vol 8, no 4, 1969, p 322-328 96 refs

A survey of literature on bioengineering, biocontrol, medical physics, biotechnology, safety, and human factors in technology has been performed by the author. While the results are by no means final or indisputable, they are comprehensive and meaningful. A correlation of three different phases of this data is possible and might be promising and interesting. Phase one is material on human tolerance to external excitations, and exposure to environmental conditions. The engineering approach is used to find out in what environmental conditions the 'human black box' is designed to perform best, how it reacts and responds to shocks and extreme conditions, and what conditions should be considered extreme, intolerable, dangerous, and lethal. The second phase consists of human responses, in terms of electric signals, to various stimuli. Skin potentials, and heart, brain, muscle, retina, and other waves and signals are analyzed. The third phase is a collection of data on human poles and zeros. The human operator is described in engineering terms of transfer functions, describing functions, time constants, time delays, settling times, natural or corner frequencies, and bandwidths in an attempt to consider a human operator as a part of a dynamic system and describe the human block in terms of a simple, low order transfer function for a particular mode of action. The results are tabulated in a form of frequency-domain and time-domain characteristics. (Author)

A70-23699 * Experimental biology of extreme environments and its significance for space bioscience S M Siegel (Hawaii, University, Honolulu, Hawaii) *Spaceflight*, vol 12, Mar 1970, p 128-130 NASA-supported research

Discussion of the study of biological performance under acute environmental stress as a way of gaining insight into the potential of earth-type life as it exists here and elsewhere in the cosmos. The experimental transposition of conventional organism-environment relationships is discussed in cases of desert plants surviving under water and starfish living on dry land. The effects of extreme gravity, radiation, oxygen, pressure, salinity, and heat environments are also considered. T M

A70-23873 # Nervous stress and cardiac activity (Nervnno napriazhenie i deiatel'nost' serdtsa) I I Vainshtein, M N Valueva, V L Karpman, A Ia Mekhedova, N G Mikhailova, D I Paikin, L A Preobrazhenskaya, P V Simonov, S E Skorikova, S I Tabachnikova, and G Khartman Moscow, Izdatel'stvo Nauka, 1969 241 p. In Russian

Experimental results are given for the characteristics of cardiac activity during excited states of cerebral structures not accompanied by physical exertion. Human cardiac activity was studied during different emotional states and in an attentive situation. Cardiovascular reactions are examined for different types of stimulation of the hypothalamus. The cardiac component of complex conditioned reflexes in animals is studied, attention is given to changes in cardiac activity, brain circulation, and electroencephalogram patterns during hypnotization. Human electroencephalogram changes are described during mental recollection of emotionally significant events. T M

A70-23893 * A model for human controller remnant William H Levison, Sheldon Baron, and David L Kleinman (Bolt Beranek and Newman, Inc., Cambridge, Mass.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 101-108 15 refs Contract No NAS 8-21136

A model for human controller remnant is postulated in which remnant is considered to arise from an equivalent observation noise

vector whose components are linearly independent white noise processes. Extensive analysis of data obtained from simple manual control systems verifies that this model structure holds over a wide range of input amplitudes and bandwidths, vehicle dynamics, and display locations. When the display is viewed foveally, the component noise processes are proportional to the variances of the displayed quantities. This constant of proportionality is independent of input parameters and of vehicle dynamics. (Author)

A70-23894 An evaluation of a pilot model based on Kalman filtering and optimal control Rodney D Wierenga (Lear Siegler, Inc., Grand Rapids, Mich.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 108-117 20 refs

A pilot model based on Kalman filtering and optimal control is given which, because of its structure, provides for estimation of the plant state variables, the forcing functions, the time delay, and the neuromuscular lag. The inverse filter and control problem is considered where the noise and cost function parameters yield a frequency response which is in close agreement with that found experimentally. A good correspondence with sine-wave tracking is shown including 'eyes closed' tracking. (Author)

A70-23895 Application of Gabor's elementary-signal theorem to estimation of nonstationary human spectral response Edward R F W Crossman and H Peter Delp (California, University, Berkeley, Calif.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 118-123 10 refs PHS Grant No UI-00016-02

Consideration of the problem of forming sequential gain and phase estimates needed to permit direct study of time variations in human response. The conventional Fourier transform with 'boxcar' data window is shown to be unsatisfactory. Gabor's theory of elementary signals is cited to show that Fourier transformation with Gaussian data weighting yields an optimum combination of spectral and time resolution. A fundamental relationship representing the constraint on the estimation procedure for this window is presented. The Gabor (Gaussian-weighted Fourier) transform is introduced. Some consequences of implementing this procedure are briefly discussed, and empirical results are presented in verification. (Author)

A70-23896 * Effects of display gain on human operator information processing rate in a rate control tracking task Daniel L Baty (NASA, Ames Research Center, Moffett Field, Calif.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 123-131

A single-axis rate control tracking experiment was conducted to determine the sensitivity of transinformation (information processing rate in bits/s) to display gain, display type (pursuit or compensatory), and forcing function bandwidth. Four other performance measures were also derived: relative error, relative noiseless error, relative remnant, and system open-loop crossover frequency. It was shown that human information processing rates increased to a maximum and then decreased as a function of both display gain and forcing function bandwidth. In general, little difference in transinformation performance was noted between pursuit and compensatory displays. (Author)

A70-23897 * Some examples of pilot/vehicle dynamics identified from flight test records Rodney C Wingrove, Frederick G Edwards, and Armando E Lopez (NASA, Ames Research Center, Moffett Field, Calif.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 131, 132

This communication illustrates a simple technique for identifying the pilot/vehicle describing functions from routine flight test records. This technique provides a straightforward method of

analyzing and comparing the dynamics of closed-loop attitude control tasks from actual flight test operations. Some results from the Gemini and X-15 flight test records tend to confirm previous findings that the pilot tries to adjust his dynamics such that the combined pilot/vehicle describing function can be described by a simple crossover model (Author)

A70-23898 Analysis of step tracking in normal human subjects Gyan C Agarwal (Illinois, University, Presbyterian-St Luke's Hospital, Chicago, Ill.) and Gerald L Gottlieb (Illinois, University, Chicago, Ill.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 132-137 10 refs

In this communication, some observations of the step-tracking situation in normal human subjects are presented. The muscle systems around the ankle joint were studied. The experiments indicate that the predominant control law seems to be a unilateral activation of the appropriate muscle with some lead compensation. The antagonist muscle is simply turned off and not used as an active brake on the action, with one exception as noted in the results (Author)

A70-23899 Corroborative data on normalization of human operator remnant Henry R Jex and Raymond E Magdaleno (Systems Technology, Inc., Hawthorne, Calif.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 137-140 14 refs

Partial endorsement of the view of Levison et al (1968a, 1968b) of Bolt Beranek and Newman (BBN) that the normalized observation noise spectra were remarkably similar for many cases of human operator remnant for certain tracking situations. Independent data to evaluate their scheme for normalizing remnant data are presented. The BBN normalized remnant data are generally supported by carefully taken data from other laboratories. The shape of all spectra are similar, although the levels are not always equal. Systems Technology, Inc (STI) data for second-order elements (requiring lead equalization) agree with the basic BBN model even better than their own published data. The smooth broad band nature of the normalized remnant injected at the error point justifies a simple analytical fit by a first-order filtered-noise two-parameter model. Remnant data from certain unstable controlled element situations do not coalesce when normalized, implying either a residual remnant or deliberate operator suppression of remnant F R L

A70-23900 * Application of a modified fast Fourier transform to calculate human operator describing functions Richard S Shirley (NASA, Electronics Research Center, Office of Control Theory and Applications, Cambridge, Mass.) *IEEE Transactions on Man-Machine Systems*, vol MMS-10, Dec 1969, pt 1, p 140-144 5 refs

A modified fast Fourier transform (FFT) is used in a hybrid computer program to permit processing of tracking data during a run to yield the human operator's describing function almost immediately after the data-taking period. The computer processing time is substantially reduced at no cost in accuracy (Author)

A70-24001 Metabolic responses during distance running David L Costill (Ball State University, Muncie, Ind.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 251-255 15 refs. Research supported by the Ball State University

Description of field and laboratory examinations which were made on highly trained distance runners to determine the changes in blood lactate during prolonged, exhaustive running at varied intensities and durations. There was an inverse curvilinear relationship between the length of the competitive race and blood lactate concentration. When the oxygen requirement of the run was less than 70% of the runner's aerobic capacity, little or no increase in blood lactate was observed M M

A70-24002 Serum lactate dehydrogenase isoenzyme changes after muscular exertion Leslie I Rose, Stephen L Lowe, Dennis R Carroll, Steven Wolfson, and Kenneth H Cooper (USAF, Medical Center, Lackland AFB, Tex.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 279-281 12 refs

Isoenzymes of lactate dehydrogenase (LDH) were measured in the serum of nine well-conditioned male volunteers before and after a 10,000-m run. The only significant change occurred in LDH-5 (the skeletal muscle and liver fraction), and no change was observed in LDH-1 and -2, the fractions found in cardiac muscle and kidney. This finding implies that as determined by changes in the isoenzymes of LDH, little, if any, damage to the myocardium results in well-conditioned individuals after the physiologic stress of a 10,000-m run (Author)

A70-24003 Diffusional transport in the human lung Richard Conley La Force (Mayo Foundation, Rochester, Minn.) and Benjamin M Lewis (Wayne State University, Detroit, Mich.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 291-298 14 refs. PHS Grants No. HE-02379 13, No. HE-11296 01

Calculations of the time for gaseous diffusion were made by finite difference techniques in a dichotomously branched model of the human lung. The lengths and cross-sectional areas of the branches were derived from anatomical data and the diffusion coefficient was that of O₂ diffusing into N₂. Finite difference equations for treating diffusion at a branch point were developed. If the diffusion front was established at the terminal bronchioles, O₂ concentration in the terminal alveoli rose to a plateau value in 2 sec which was maintained for 50 sec. A diffusion front in the alveolar ducts led to a plateau in 1 sec. Critical examination of the assumptions made in this model (axial diffusion, a square, stationary front, and symmetrical branching) does not affect the conclusion that no significant concentration gradient exists between gas in the terminal bronchioles and gas distal to this point during the normal respiratory cycle. Physiological data on the reason for the slope of the alveolar plateau are briefly reviewed (Author)

A70-24004 * Effect of body position on vertical distribution of pulmonary blood flow John H Reed, Jr (Mayo Clinic and Mayo Foundation, Rochester, Minn.) and Earl H Wood (Minnesota, University, Rochester, Minn.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 303-311 34 refs. Research supported by the American Heart Association, NIH Grants No. HE-3532, No. FR 0007, Grant No. NSG 327

Vertical distribution of pulmonary blood flow (DPBF) was studied, using radioactive microsphere emboli, in dogs without thoracotomy when positioned in prone, supine, head up, head down, right decubitus, and left decubitus positions. Simultaneous measurements of aortic, pulmonary artery, left atrial, and airway pressures and nearly simultaneous measurements of cardiac output were obtained at each determination of DPBF. This technique requires uniform mixing of microspheres in the blood after injection into the right ventricular outflow tract so that embolization of the pulmonary vascular bed is in proportion to the fraction of the cardiac output traversing each segment. Results indicate this was valid and that in all six positions pulmonary blood flow (ml/min per ml lung tissue) was least to whatever region of lung was located most superiorly in the thorax. Because this relationship pertained regardless of the anatomic orientation of the thorax with respect to gravity, the force of gravity must be an important determinant of DPBF. However, DPBF determined by this method is not predicted accurately by the Starling resistor analog. Probably, gravity-dependent regional differences in pleural and associated interstitial pressures plus possible changes in vascular tone resulting from deficient aeration of the blood in the most dependent regions of the lung also affect DPBF. However, the finding that apical blood flow per milliliter of lung tissue at midlung level in the supine position was less than at the base cannot be readily explained by gravitational effects alone (Author)

A70-24005 **Effect of sodium balance on intrarenal distribution of blood flow in normal man** N K Hollenberg, M Epstein, R D Guttman, M Conroy, R I Basch, and J P Merrill (Harvard University, Peter Bent Brigham Hospital, Boston, Mass.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 312-317 39 refs Research supported by the John A Hartford Foundation, NIH Grant No SM 01-FR 31 08, Contract No DA 49-193-MD 2497

Determination of the intrarenal distribution of blood flow in normal man with the xenon washout method. Restriction of sodium intake resulted in a significant decrease in the flow rate and percentage of flow in the most rapid flow component, which probably represents cortical perfusion. The findings are consistent with a role of intrarenal blood flow redistribution in renal sodium handling and suggest that the mechanism controlling intrarenal flow distribution is not a simple function of plasma volume. M M

A70-24006 * **Body temperatures and sweating during thermal transients caused by exercise** B Saltin, A P Gagge, and J A J Stolwijk (John B Pierce Foundation, Yale University, New Haven, Conn.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 318-327 32 refs NIH Grant No ES-00354-02, Contract No NAS 9 7140

Description of continuous observations of oxygen uptake, weight changes, skin, esophageal, rectal, and quadriceps muscle temperatures, as well as skin conductance and skin evaporation, during thermal transients caused by bicycle exercise. No linear combinations of the temperatures could predict skin conductance and skin evaporation under all conditions of rest, exercise and ambient temperatures and account for more than 65% of the data. Thermoregulatory signals from the observed body temperatures may have interacted nonlinearly, or other important sources of thermal and nonthermal signals may not be represented by the temperature measurements made. M M

A70-24007 * **A method for recording myocardial ECG in animals during intense vibration** Donald J Sass (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md.) *Journal of Applied Physiology*, vol 28, Mar 1970, p 361-364 6 refs NASA Contract No R-10

In studies of effects of whole body vibration in cats we have been unable to record the electrocardiogram using conventional methods when the animal is vibrated with peak acceleration exceeding about plus or minus 4 g. The present study shows, however, that the electrocardiogram can be recorded from myocardial electrodes during whole-body vibration with peak acceleration up to plus or minus 15 g. Satisfactory electrodes consist of two no. 30 AWG enameled copper wires sutured into the myocardium at one end of each wire with the two free ends brought out through the vascular system. Clinical quality electrocardiograms were not recorded using this method in anesthetized cats, but tracings were produced in which the base line and R waves are distinct throughout the period of vibration. This paper describes one method for implanting the electrodes and illustrates the results with reproductions of tracings from some of the experiments. (Author)

A70-24034 # **Studies on recovery from heat induced physiological strain** C A Verghese, K C Sinha, and Shri K V Mani (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 5-14 5 refs

Recovery from raised mean body temperature caused by thermal stress was studied in different recovery environments. Recovery pattern is found to be exponential with the value of time constant related to the effective temperature of the environment by the equation $T = a + b \cdot c$ where T is the effective temperature, c is the time constant, a and b are constants. Oral temperature and heart rate recovery were also observed. Significance of oral temperature in the early phases of recovery is brought out. Aeromedical application of these studies are discussed. (Author)

A70-24035 # **The incidence of refractive errors and their relationship to visual acuity** T G Jones *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 15-24

Study of the incidence of refractive errors at various visual acuity levels, and the effect of refractive errors on the visual acuity. A detailed analysis covering the refraction of 21,080 eyes is presented taking into account spherical, cylindrical and combined spherocylindrical refractive errors. As a result, correlations are determined providing a firm basis for setting visual requirements in terms of refraction limits. Suggested standards on this basis are tabulated. O H

A70-24036 # **Effects of precooling on heat tolerance and estimation of precooling requirements** K C Sinha and C A Verghese (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 25-30 6 refs

Investigation of the effect of prior body cooling on the heat tolerance of the aircrew subjected to severe heat stresses, and the precooling requirements. The test procedure is described, and the results are tabulated and discussed. It is shown that there actually is an extension in tolerance time by prior body cooling. O H

A70-24037 # **Disorders of carbohydrate metabolism in cases of head injury** K C Sinha and H Lakshminarayan (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 31-40 6 refs

55 head injury cases were studied. There was evidence of disorder of carbohydrate metabolism of varying degrees in 29% of the cases as compared to 4% in control group of similar age distribution. The incidence of disorder of carbohydrate metabolism in head injury cases appeared to be more common (20%) than E E G abnormalities (9%). There was no correlation between the disorder of carbohydrate metabolism on the one hand and types and clinical severity and head injury on the other. The possible mechanisms have been discussed. (Author)

A70-24038 # **Some feed back control systems of the human body** N Mohan Murali (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 41-47 8 refs

Discussion of the autoregulation of homeostatic mechanisms in human body. Various control systems of the human body are discussed which maintain the constancy of the internal environment by employing negative feedback. The feed back control systems regulate blood pressure, vary the flow of blood to organs and the rate of breathing to the level of metabolic requirements, provide the smooth coordinated bodily movements and postural control, etc. O H

A70-24039 # **Ballistocardiography** P C Chatterjee (Indian Air Force, Institute of Aviation Medicine, Bangalore, India) and S Krishnamurti (Indian Air Force, Hospital, Bangalore, India) *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 48-56 11 refs

Discussion of the ballistographic methods used for psychological evaluation of the heart and the circulatory system by recording the force imparted to the body during each heart beat. In these methods, the so-called ballistic effect resulting from the heart beat is analyzed in terms of the following parameters: displacement force, velocity force, acceleration force, and total force. The ballistographic techniques are described, and several examples and ballistograms are presented. O H

A70-24040 # Otitic Barotrauma with bilateral perforations—A case report V S N Murty *Aero Medical Society of India, Journal*, vol 12, Oct 1969, p 62-66

Report of a rare case of Otitic Barotrauma with bilateral perforation of the ear drums suffered during a rapid decompression run in a decompression chamber. The diagnostic difficulties are discussed. A probable mechanism by which the perforations could have been caused, are suggested. O H

A70-24060 A survey of the acute toxicity of elemental fluorine P M Ricca (Boeing Co., Biotechnology Dept., Seattle, Wash.) *American Industrial Hygiene Association Journal*, vol 31, Jan-Feb 1970, p 22-29 26 refs

This paper reviews past and recent experiments which have greatly expanded the body of pathotoxicological knowledge on elemental fluorine. The physiochemistry of fluorine reactions with animal proteins and lipids was considered. Toxicity data on short-term animal exposures were compiled, normalized, and correlated with human data. The significance and application of several types of toxicity limits were discussed, and values for emergency exposure limits (EEL), emergency tolerance limits (ETL), and threshold limit values (TLV) were suggested. These values were EEL = 25.0 ppm for 5 minutes, ETL = 15.0 ppm for 10 minutes, and TLV = 1.0 ppm for 8 hours. (Author)

A70-24061 Considerations in the evaluation of the biological effects of exposure to microwave radiation. Stephen F Cleary (Virginia, Medical College, Richmond, Va.) *American Industrial Hygiene Association Journal*, vol 31, Jan-Feb 1970, p 52-59 35 refs PHS Contract No CPE-R-69-03

Reevaluation of the available information concerning the biological effects of exposures to microwave and uhf radiation. A review of the thermal (greater than 10 mW/sq cm) and nonthermal effects of microwave and uhf exposure on organisms, organs, cells, bacteria, and biological molecules is presented, as well as the exposure limits that have been based on such data. It is suggested that the area of greatest uncertainty is the effects of nonthermal exposure on the central nervous system. Suggestions are made for additional research on the effects of nonthermal exposures at various levels of biological systems. (Author)

A70-24062 A preliminary study of national health hazards from lasers. Marshall LaNier, Vernon E Rose, and Charles H Powell (U.S. Public Health Service, Bureau of Occupational Safety and Health, Cincinnati, Ohio) *American Industrial Hygiene Association Journal*, vol 31, Jan-Feb 1970, p 60-68 6 refs

The techniques of industrial hygiene and epidemiology have now been combined in an effective survey procedure that permits the assessment of potential occupational health hazards associated with laser operations. Included in this assessment are such factors as the physical characteristics of the laser and laser area, the operating procedures and controls, and health services and programs available to the laser operator. Results are based on a statistical sample of the lasers in the United States and are representative of industrial, research, communication, and educational groups who are known to use laser devices. (Author)

A70-24176 Serotonin and other vasoactive agents in experimental decompression sickness M L Clark, R B Philp, and C W Gowdey (Western Ontario, University, London, Ontario, Canada) *Canadian Journal of Physiology and Pharmacology*, vol 47, no 12, 1969, p 1033-1035 20 refs Defence Research Board of Canada Grant No 9310-102

Experimental investigation in which a number of vasoactive agents were screened for their effects on the incidence and severity

of decompression sickness in rats by a standardized bends-inducing procedure involving compression, decompression, and exercise in altitude. None of the substances in the dosage schedules used altered the incidence of bends, but serotonin markedly increased the severity. This result is stated to be interesting in view of recent laboratory observations on the role of platelets in decompression sickness. M M

A70-24200 Studies on the morphology of the sensory regions of the vestibular apparatus H H Lindeman (Ullevål Hospital, Oslo, Norway) Research supported by the Norges Almenvitenskapelige Forskningsråd, the U.S. Navy, Contract No N-62558-4264, and the U.S. Air Force, Contract No AF 61(052)-67-C-0090 Berlin, Springer-Verlag (Ergebnisse der Anatomie und Entwicklungsgeschichte Volume 42, No 1), 1969 112 p 204 refs \$9.75

Study of the structure of the vestibular apparatus on temporal bones of the guinea pig, rabbit, cat, squirrel monkey and man. The study is based on microdissection and on sections made for light/phase-contrast and electron microscopy. The specific objects of detailed study include the vestibular ducts and sacs, the vestibular nerve and its ramifications, the vestibular sensory epithelia, the cupulae, and the statoconial membranes. Special attention is given to the morphological polarization of sensory cells and to the innervation of the vestibular sensory epithelia. The study reveals a highly differentiated structural organization of the vestibular sensory regions. These observations indicate that the different areas are functionally dissimilar, a suggestion which is further supported by the findings of clear regional differences in the sensitivity of the vestibular sensory cells to ototoxic antibiotics. M V E

A70-24212 * # Human perception of angular acceleration and implications in motion simulation John D Stewart (NASA, Ames Research Center, Moffett Field, Calif.) *American Institute of Aeronautics and Astronautics, Visual and Motion Simulation Technology Conference, Cape Canaveral, Fla., Mar 16-18, 1970, Paper 70-350* 8 p 13 refs Members, \$1.00, nonmembers, \$1.50

Data on human subjective response to angular acceleration collected on the Ames Man-Carrying Rotation Device are presented and the implications of these data to motion simulation are discussed. Threshold data have been obtained for several stimulus durations, three axes of rotation, and two response indicators. These thresholds indicate that the average pilot can be very sensitive to angular acceleration. First-order approximations to the human dynamic response to angular accelerations are derived from four experiments and resulting time constants vary from 4 to 10 sec depending on the observer's task. It is demonstrated that a simple static washout concept requiring continuous rotations at subthreshold levels provides essentially useless reductions in simulator travel. Another washout scheme based on the dynamics of the vestibular system is considered. The variation in the apparent dynamics derived from the psychophysical data suggest that simulator washout characteristics may have to be tailored to each simulated flight configuration or piloting task. (Author)

A70-24226 Motor performance and sensory-evoked potentials Lawrence Karlin, Merrill J Martz, and Arnold M Mordkoff (New York University, New York, N.Y.) *Electroencephalography and Clinical Neurophysiology*, vol 28, Mar 1970, p 307-313 19 refs PHS Grant No MH-07253

Determination of averaged evoked potentials (EP) to tones for fifteen subjects in three tasks. The tasks were designed to evaluate the effects of motor response, of withholding a response, and of different response latencies. With the influence of eye movement minimized, it was found that the various deflections of the sensory EPs were affected differently in specifically described ways. No effects on the averaged EP were observed that could be attributed unequivocally to occurrence of overt motor response itself. M V E

A70-24227 A method of measuring the potentials evoked by simultaneous stimulation of different retinal regions D Regan and R F Cartwright (Keele, University, Keele, Staffs, England) *Electroencephalography and Clinical Neurophysiology*, vol 28, Mar 1970, p 314-319 21 refs Research supported by the Medical Research Council, the Migraine Trust, and Sandoz Products, Ltd

Description of a method designed to reduce the effect of the variability common to the potentials evoked in both hemispheres of the brain through simultaneous recording of the two individual potentials evoked by stimulation of the left and right half-fields Two stimulus modulation frequencies are generated, which differ by a small amount Once the frequency is set, it remains constant with time The device uses a differential gear which is driven by an electronically stabilized variable speed motor Intensity and pattern double simulators are described which are designed to minimize the effects of light scattered within the eye, and which provide complementary information The two brain signals are extracted from a high noise level by two analog Fourier analyzers, and results are presented in a quantitative form Applications to clinical problems, including migraine, are discussed M V E

A70-24323 # Influence of spaceflight factors on crepis capillaris seeds (Deistvie faktorov kosmicheskogo poleta na semena crepis capillaris) L G Dubinina and O P Chernikova *Kosmicheskie Issledovaniia*, vol 8, Jan-Feb 1970, p 156-158 18 refs In Russian

Investigation of the effects of spaceflight factors on dry crepis capillaris seeds placed for five days in an orbit with a 300-km apogee Analysis of the recovered samples shows a small but statistically significant increase in the number of chromosome rearrangements Seeds which were additionally subjected to the effects of ethylenimine after the spaceflight showed an increased mutagenic sensitivity The mutation spectrum was shifted toward a higher number of chromosome-type mutations T M

A70-24324 # Influence of spaceflight factors on barley seeds (Vliianie faktorov kosmicheskogo poleta na semena iachmenia) K P Garina and N I Romanova *Kosmicheskie Issledovaniia*, vol 8, Jan-Feb 1970, p 158, 159 5 refs In Russian

Experimental study of the influence of spaceflight factors on dry barley seeds placed for five days in an orbit with an apogee of 300 km The seeds were subsequently recovered and grown in tap water along with control seeds Analysis of the plants provides statistical confirmation that spaceflight factors increase the number of intracellular rearrangements No predominance of chromosome rearrangements was noted T M

A70-24325 * Microbiology of saturated salt solutions and other harsh environments V S M Segel (Hawaii, University, Honolulu, Hawaii) *Physiologia Plantarum*, vol 22, 1969, p 1152-1157 11 refs Grant No NGR-12-001-053

Study of the relation of inosine-5'-phosphate (IMP) and carbohydrate to the growth of a *Penicillium* mutant in KCl- and H3BO3-saturated glucose peptone broth as a basic growth medium to determine, first, whether or not IMP has any restorative activity in the presence of saturated KCl, second, the usefulness of IMP in a second extreme chemical environment, and, third, whether or not the response to IMP is at all limited by the carbohydrate source The results show that the role of nucleotides, especially IMP, is not limited to recovery from exposure to extreme salt effects, but also applies to growth in the continuing presence of quite different chemical stress conditions O H

A70-24380 A new method for calculating the period lengths of rhythmical physiological processes (Eine neue Methode zur Bestimmung von Periodenlangen rhythmisch ablaufender physiologischer Prozesse) Gunther Lamprecht and Friedrich Weber (Munster, Universitat, Munster, West Germany) *Pflugers Archiv*, vol 315, no 3, 1970, p 262-272 8 refs In German Research supported by the Deutsche Forschungsgemeinschaft

This study presents a new mathematical method which makes possible the analysis of serial measurements to calculate the period length by a digital computer All corresponding phase points in assumed periods were directly related The new method is exemplified by a series of experiments in which the activity rhythm of the beetle *Carabus cancellatus* was tested In most of the measurements series analyzed the new method yields results which differ from those of autocorrelation and which facilitate a more accurate description of *Carabus* rhythmic behavior In the other cases the results are identical The new method is most likely to yield better results in calculating the period length of other rhythmical physiological processes (Author)

A70-24390 Mechanisms of formation and significance of biologically active proteins in the organism (Bildungsmechanismen und Bedeutung biologisch aktiver Eiweisse im Organismus) Rolf Kleine (Halle, Universitat, Halle, East Germany) *Naturwissenschaftliche Rundschau*, vol 23, Mar 1970, p 94-103 62 refs In German

Study of the formation and functioning of biologically active fragments liberated from inactive proteins Limited proteolysis as a means of enzyme activation and as a means of hormone liberation is considered Processes of zymogen activation, milk and blood clotting, and hormone activation are explained by means of thoroughly investigated examples In the case of a number of biologically active proteins it was noted by controlled in vitro proteolysis that the effectiveness of these proteins is determined not by the entire polypeptide chain but only by certain regions of it

A B K

A70-24396 * Control of the mammalian pineal by light and sympathetic nerves Richard J Wurtman (MIT, Cambridge, Mass) In *Progress in endocrinology, Proceedings of the Third International Congress of Endocrinology, Mexico City, Mexico, June 30-July 5, 1968* Edited by C Gaul New York, Excerpta Medica Foundation (Excerpta Medica International Congress Series No 184), 1969, p 627-630 17 refs PHS Grants No AM-11709, No AM-11237, Grant No NGR-22-009-272

Review of experiments in which light and sympathetic nerve stimulation were used for controlling the function of the pineal organ of mammals Published studies of various authors are quoted to indicate that certain specific mechanisms are active in the photic control of the pineal function Also quoted is an unpublished study according to which injections of melatonin elevate the brain serotonin levels, especially in the midbrain and hypothalamus V Z

A70-24412 * Controlling thermal comfort in the EVA space suit Alan B Chambers (NASA, Ames Research Center, Biotechnology Div, Moffett Field, Calif) *ASHRAE Journal*, vol 12, Mar 1970, p 33-38 8 refs

Discussion of the evolution of present-day extravehicular-activity (EVA) space suits The problems of maintaining appropriate body temperatures, under various conditions and work loads, are emphasized The complete astronaut protective system currently includes a full pressure suit (A7L) with an oxygen ventilation system, the liquid cooled garment (LCG), the portable life support system (PLSS), and the accessory garments used for thermal and meteoroid protection (TMG) Together they comprise what is known as the extravehicular mobility unit (EMU) Along with improved cooling techniques and automatic controllers, an advanced EVA space suit is

being developed. The new suit will provide the astronaut with increased mobility at a lower energy expenditure. With this decreased energy expenditure, the astronaut's heat production also will be less, and comfort will be easier to achieve. M M

A70-24503 A modified apparatus for the volumetric determination of alveolar carbon dioxide. L R C Haward. *Flight Safety*, vol 3, Feb 1970, p. 3, 4. 11 refs

Description of an apparatus based on the design of Scholander (1942), as modified by Asmussen and Buchtal (1949) for the volumetric determination of alveolar carbon dioxide. A reduction in the percentage of alveolar carbon dioxide can be of considerable diagnostic importance, indicating the degree of hyperpnea of the pilot. The apparatus consists essentially of a 25 ml glass reservoir, connected by approximately two feet of thick rubber tubing to a 10 ml pipette graduated on 0.01 ml intervals. Certain errors involved in the usage of the Asmussen version of Scholander's device have been obviated by the redesign, and reading accuracy is improved. The cost of manufacture is considerably reduced. F R L

A70-24504 The SAS system of selection of pilots III—Validity. A Trankell (Pedagogiska Institutionen, Stockholm, Sweden). *Flight Safety*, vol 3, Feb 1970, p. 5, 6

Evaluation of the validity of the SAS pilot and captain selection system which is based in part on the STANINE (standard nine) system of psychological assessment of suitability. In the STANINE system, a score of 5 is the break even point, hence scores of 5 to 9 indicate different degrees of suitability, and scores of 4 to 1 indicate an increasing probability of negative prediction. The suitability of 2042 persons has been assessed over a period of 16 years. It appears that there is a definite correlation between the STANINE scores achieved by pilots still in service, and the lower scores achieved by pilots who left the service for various reasons. F R L

A70-24505 Thermal stress and human performance. M F Allnutt (RAF, Institute of Aviation Medicine, Farnborough, Hants, England). *Flight Safety*, vol 3, Feb 1970, p. 7-9. 28 refs

Examination of question of how far the temperature of the environment can vary from the normal before human performance will begin to show a decrement when the type of performance has a high mental and low physical workload. The study is confined to the 'too hot' environment. Previous studies, treating the effects of high ambient temperatures, raised body temperatures, and physiological factors are reviewed. Situational variables are considered which pertain to the man, the task, and the environment. F R L

A70-24534 * Leucine naphthylamide. An appropriate substrate for the histochemical detection of cathepsins B and B'. J Ken McDonald, Benjamin B Zeitman, and Stanley Ellis (NASA, Ames Research Center Environmental Biology Div., Moffett Field, Calif). *Nature*, vol 225, Mar 14, 1970, p. 1048, 1049. 15 refs

Refutation of Sylvén and Snellman's report that purified beef spleen cathepsin B catalyzes the hydrolysis of both benzoylarginine beta-naphthylamide and leucine beta-naphthylamide. Obtained evidence indicates that these two compounds are hydrolyzed by different enzymes and that neither of these is cathepsin B. It is believed, in light of obtained results, that Sylvén and Snellman's studies were conducted with a partially purified preparation of lysosomal cathepsin B' that was contaminated with an aminopeptidase. M V E

A70-24548 # Silastene coating for the reduction of pollution in a hot-shot wind tunnel—Spectroscopic inspection (Revêtement de silastène pour la réduction des pollutions dans une soufflerie à arc—Contrôle par spectroscopie). François Carrega and Jean-Pierre Chevallier. *La Recherche Aérospatiale*, Jan -Feb 1970, p. 51-53. In French

Consideration of a consumable protective coat (silastene) applied to reentry models as a means of combating metallic pollution in hot-shot wind tunnels. Such pollution can have an influence, difficult to evaluate, on the rate of ionization of the gas. It originates mainly from the wall of the arc chamber supplying the wind tunnel. The silastene coat makes it possible to eliminate undesirable metallic pollution, and to introduce an interesting trace element. The spectrographic analysis of the plasma which forms around a model makes it possible to learn the nature of the pollutions in a flow at high Mach numbers. F R L

A70-24598 # The measurement and the regeneration of the water vapor loss of human skin. David Spruit. Nijmegen, Katholieke Universiteit, Faculteit der Rechtsgeleerdheid en der Sociale Wetenschappen, Doctor in de Wiskunde en Natuurwetenschappen Dissertation, 1969. 162 p. 181 refs

A study is made of the factors influencing the hydrodiffusion through the skin, measurements methods, and regeneration of the injured skin. A short review of the available measuring methods is presented, and the reasons are discussed for the choice of the thermal conductivity cell as a sensitive measuring element in the determination of the skin's vapor loss in environmental humid air. The evaporation resistance of the water barrier of skin is investigated using the evaporation of the n-hexadecane as a reference substance. An examination is made of the water vapor loss of human skin under effect of the humidity of the environmental air, using a piece of a cadaverous human skin of the back and, in vivo, skin of the forearm. In these studies, quantitative results are obtained. The relation between the water vapor loss of the skin and the extent of the injury is investigated. A number of experiments was carried out for investigating the effect of the pH upon the alkali neutralization rate of the skin, using the alkali neutralization and alkali resistance tests introduced by Burckhardt (1947). Additional experiments were carried out to investigate the regeneration of the water barrier after exposure to high pHs. The effect of exposures of human skin in vivo for one hour or 15 min during 6 successive days to various organic substances is investigated. It is shown that measurements of the water vapor loss during and after repeated exposures to such substances may be used to obtain information about the protective qualities of the horny layer during such an attack and during the following regeneration period. Z W

A70-24599 # Differential luminance sensitivity of the human visual system. Johan Marie Thijssen. Nijmegen, Katholieke Universiteit, Faculteit der Rechtsgeleerdheid en der Sociale Wetenschappen, Doctor in de Wiskunde en Natuurwetenschappen Dissertation, 1969. 88 p. 114 refs

The differential luminance sensitivity of the human eye is investigated by methods derived from the theory of signal detection. The theory of signal detection is applied to sensory discrimination procedures. Concepts of this theory are compared with those of other theories on sensory detection. Two alternative detection models are examined. The results of the detection and discrimination experiments are presented. The detection experiments were carried out at various levels of background intensity and of the adaptational state of the eye. The discrimination experiments were used to decide which of the detection models is most suitable to apply to the visual system. The results obtained are correlated with electrophysiological data of other authors. Discrimination experiments are also presented in which the retinal and cortical evoked responses are recorded during the sessions. In these experiments it is investigated whether the evoked responses are correlated with the psychophysically

observed answers of the subject, or not. The results of the psychophysical experiments are used to quantify the various components of the multirange meter model. Z W

A70-24660

The professional personality of the aviator (La personnalité professionnelle de l'aviateur) Gelly (Ministère des Armées, Service de Santé des Armées, Paris, France) *Forces Aériennes Françaises*, vol 24, Feb 1970, p 143-158. In French

Study of the aeronautical motivation of pilots, commencing with the origins of personality and the different steps in its maturation. It is considered that defense mechanisms, the Oedipus complex, infant sexuality, and identification with the father are factors. The role of the Icarus complex, which involves the father-son relationship and the defying of paternal authority, is evaluated. In adolescence, the motivation becomes the desire to pilot, following up on the earlier desire to fly. In the training years there is something of a conflict between the instinct of self preservation and the desire to fly. An ambivalent relationship arises between the pupil and the instructor. A central concept, useful in understanding the professional personality of a pilot, hinges on the pleasure of flight. Upon completion of training, the earlier fantasies seem to be superseded by a realistic outlook, and a stable personality evolves. F R L

A70-24665

Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvzhnosti i ego vlianie na organizm cheloveka) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969. 263 p. In Russian

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Principal results of the investigations of the effect of a 70 day hypodynamia on the human organism (Osnovnye rezul'taty issledovaniia vlianiia 70-sutochnoi gipodinamii na organizm cheloveka) A M Genin, P A Sorokin, G I Gurvich, T T Dzhargarov, A G Panov, I I Ivanov, and I D Pestov, p 247-253 8 refs (See A70-24696 10-04)

A70-24666 # Prolonged restriction of mobility as a model of the influence of weightlessness on the human organism (Dlitel'noe ogranichenie podvizhnosti kak model' vlianiia nevesomosti na organizm cheloveka) A M Genin and P A Sorokin In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 9-16 13 refs In Russian

Investigation of experimental methods of estimating the biological effects of prolonged weightlessness Attention is given to the study of reactions arising during laboratory simulation of certain factors which are characteristic for prolonged weightlessness Emphasis is placed on the relative value of bed confinement, and the basic concepts involved in studies of 70-day hypodynamia are outlined T M

A70-24667 # Organizational and methodical principles of conducting investigations during prolonged hypodynamia (Organizatsionno-metodicheskie printsipy provedeniia issledovaniia pri dlitel'noi gipodinamii) P A Sorokin, A M Genin, M I Tishchenko, P V Vasil'ev, R I Gismatulin, and I D Pestov In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 16-23 In Russian

Clinical study of the influence of prolonged hypodynamia on the human organism in five series of experiments conducted with 16

subjects subjected to 70 days of bed confinement The first series involved four control subjects who were exposed to pure hypodynamia Twelve remaining subjects participated in the other four experiments which differed by the prophylactic measures applied to the subjects General methodological principles which should be followed are outlined T M

A70-24668 # Clinical observations during prolonged hypodynamia (Klinicheskie nabludeniia pri dlitel'noi gipodinamii) P A Sorokin, V V Simonenko, and B A Korolev In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 24-34 27 refs In Russian

Results of clinical observations from five series of experiments conducted with 16 healthy young (21 to 23 years of age) men confined to bed for a 70-day period It is shown that prolonged hypodynamia has specific psychological effects Certain subjects exhibited an 'expectancy neurosis' toward the end of the experiment, however most subjects maintained a will to complete the entire test period, and only one had to be removed due to psychoneurotic reactions Prolonged inactivity had harmful physical effects, and data show a clearly disturbed gastroenteric function A serious deterioration of the organism's immunobiological properties is evident, and data are given for the occurrence of various illnesses T M

A70-24669 # Changes of the electrocardiogram and of the statistical structure of the cardiac rhythm in the course of bed confinement periods (Izmeneniia elektrokardiogrammy i statisticheskoi struktury serdechnogo ritma na protiazhenii periodov postel'nogo rezhima) A D Voskresenskii, B A Korolev, and M D Venttsel' In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 34-41 15 refs In Russian

Analysis of electrocardiogram recordings taken for 16 subjects at various periods of a 70-day hypodynamia experiment involving restriction of physical activity All subjects exhibited positional variations, relative changes in conductivity, decreased amplitudes of R and T peaks, changes in the ratios of T values in different readings, periodic shifts of the S-T segment, and changes of the repolarization process Subjects performing a set of physical exercises exhibited these changes at a later stage and with less regularity Correlation functions, calculated from series of 200 to 300 successive values of the R-R interval, show a pattern of respiratory arrhythmia and illustrate the onset of wavelike changes in the rhythm which are not associated with respiration T M

A70-24670 # Changes in the hemodynamics during prolonged hypokinesia on the basis of mechanocardiography data (Izmeneniia gemodinamiki pri dlitel'noi gipokinezii po dannym mekhanokardiografii) V V Simonenko In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 42-49 17 refs In Russian

Investigation of the hemodynamics and of the vascular tonus in 16 healthy young (21 to 23 years of age) men who were confined to a strict regimen of restricted physical activity for a 70-day period Prolonged hypokinesia is accompanied by an increased influence of sympathetic innervation on the cardiovascular system Hypokinesia changes human reaction to cold as expressed by a changed phase of

reaction, a decreased intensity of the reaction, and reduced vascular tonicity. Physical training somewhat decreases the effects of hypokinesia on the cardiovascular system but does not overcome them entirely. T M

A70-24671 # Changes in the hemodynamics during prolonged hypokinesia on the basis of the dye dilution method (Izmeneniia gemodinamiki pri dlitel'noi gipokinezii po dannym metoda razvedeniia krasitelia) A P Pekshev In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 49-58 13 refs In Russian

Application of the dye dilution method to study the effects of prolonged hypodynamia on the cardiac minute and stroke volumes, the mass of the circulating blood, the hematocrit, the cardiac index, and the time of complete blood circulation. As a rule, hemodynamic changes increase with the duration of hypodynamia, but in certain cases circulation indices become stabilized or return to their initial values as the experiment progresses. This indicates a certain capability of adaptation to hypodynamia in the cardiovascular system. Hypodynamia causes (1) a clearly evident reduction in stroke volume, minute volume, and central blood mass, (2) a lowering of the circulating plasma, (3) an increase of the hematocrit, and (4) increased duration of complete circulation. The effects of prophylactic measures on these changes are outlined. T M

A70-24672 # Variation in the phases of the cardiac cycle during prolonged hypodynamia on the basis of polycardiographic and kinetocardiographic data (Izmenenie faz serdechnogo tsikla pri dlitel'noi gipodinamii po polikardiograficheskim i kinetokardiograficheskim dannym) M I Tishchenko, B A Korolev, V A Degtiarev, and B F Asiamolov In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 59-64 10 refs In Russian

Results of a phase analysis of human cardiac activity during a 70-day hypodynamia experiment involving restriction of physical activity. Changes in the phase structure of the cardiac cycle are expressed by (1) shortened mechanical systole, (2) a reduced phase of blood expulsion, (3) an increased phase of tension, isometric contraction, and weakening of the myocardium, and (4) a reduced initial rate of increase in the intraventricular pressure. Normal phase behavior is reconstituted by the fourth week after hypodynamia. T M

A70-24673 # Influence of prolonged hypodynamia on the size of the heart and on the functional state of the myocardium (Vliianie dlitel'noi gipodinamii na velichinu serdtsa i funktsional'noe sostoiianie miokarda) I G Krasnykh In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 65-71 9 refs In Russian

Results of an X-ray study of human chest organs during prolonged (70 to 73 days) hypodynamia. It is shown that prolonged hypodynamia causes significant hemodynamic disorders which lead to a 12.9 to 17.9% reduction in heart size. Pharmacological media reduced these changes by a factor of two in two subjects (as compared to a control subject) but had no effect on a third subject. The myocardial contraction function changed in all subjects, and physical exercise also reduced the magnitude of the changes. T M

A70-24674 # Certain features of external respiration and gas exchange during prolonged hypodynamia (Nekotorye osobennosti vneshnego dykhanii i gazoobmena pri dlitel'noi gipodinamii) M I Mikhasev, V I Sokolov, and M A Tikhonov In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 71-78 13 refs In Russian

Investigation of the effects of 70-day hypodynamia on the human basic volume level, the spiographic and pneumotachometric indices of external respiration, the arterial blood oxygenation, the circulation rate, and gas exchange under various physical stress conditions. The basic volume was lowered by 5 to 21%, the pulmonary circulation volume was reduced, oxygen consumption during orthostatic tests increased, and resistance to physical stress decreased. Physical training and pharmacological media reduced these changes. T M

A70-24675 # Nutrition and metabolism during prolonged hypodynamia (Pitanie i obmen veshchestv pri dlitel'noi gipodinamii) M S Seregin, I G Popov, Z N Lebedeva, O A Goriacheva, S A Kamforina, P V Oblapenko, P F Vokhmianin, and L A Andreeva In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 78-93 7 refs In Russian

Study of the effect of prolonged hypodynamia (up to 70 days) on the nutritional habits and metabolism of human subjects. A decrease in the energy requirement was noted, as well as a decrease in body weight. The level of protein metabolism was also found to decrease, and a negative nitrogen balance was established. The protein loss was found to amount to an average of 8 grams per day. Calcium excretion increased by 40%. The excretion of vitamins C sub 1, B sub 1, B sub 2, and PP in the urine decreased. The concentration of corticosteroids in the blood decreased, as well as their rate of excretion in the urine. An orthostatic test was accompanied by a considerable intensification of the functioning of the hypophyseal-adrenal system. Neither physical exercises nor pharmacological agents could prevent metabolism disturbances. A B K

A70-24676 # Mineral saturation of bone tissue under conditions of prolonged hypodynamia (Mineral'naia nasyschennost' kostnoi tkani v usloviakh dlitel'noi gipodinamii) I G Krasnykh In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 93-99 14 refs In Russian

X-ray photographic study of the level of mineral saturation in the right calcaneal bone and the first phalanx of the fifth finger of the right hand in humans subjected to prolonged hypodynamia. It is established that hypodynamia for a period of 70 to 73 days led to a reduction of calcium salts in the calcaneal bone by an average of 11.8% and to a 6.9% reduction in the first phalanx of the fifth finger. Restoration of calcium salts to the initial level was not completed even after a month. The use of a pharmacological complex as a protective measure did not have a favorable effect on the decalcination level as compared with the control. The use of physical exercises as a protective measure, and a combination of the latter with inflated femoral cuffs and pharmacological preparations ensured a smaller loss of phosphorus and calcium salts as compared with the control. A B K

A70-24677 # Study of certain biochemical indices of blood serum during prolonged hypodynamia (Issledovanie nekotorykh biokhimicheskikh pokazatelei syvorotki krovi pri dlitel'noi gipodinamii) I I Ivanov, B F Korovkin, and N P Mikhaleva In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 99-107 23 refs In Russian

Study of the changes in mineral content and enzyme activity noted in the blood serum of humans subjected to prolonged hypodynamia Toward the end of a period of prolonged hypodynamia a tendency toward a reduction in the potassium content in the blood serum was noted An increase in the activity of alkaline phosphatase in the blood serum was also noted The activity of aspartate-aminotransferase, alanine-aminotransferase, aldolase, and creatine kinase, and the content of sodium, phosphorus, calcium, microelements, and urea in the blood serum of the subjects did not change

A B K

A70-24678 # Coagulability of blood according to thromboelastographic data obtained during prolonged hypodynamia (Svertyaemost' krovi po dannym tromboelastografii pri dlitel'noi gipodinamii) E I Dorokhova In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 109-115 In Russian

Study of blood coagulation in humans subjected to conditions of prolonged hypodynamia Prolonged hypodynamia was found to be accompanied by the occurrence of an overall hemophilic reaction of the blood The partial reactions of blood coagulation changed in opposite directions Physical exercises were found to decrease hemophilic shifts A combination of physical exercises on a treadmill and a велоergometer with occlusion training somewhat reduced the antihemophilic effect of physical exercises

A B K

A70-24679 # Antinfection resistance of an organism under conditions of hypodynamia (Antinfektsionnaia rezistentnost' organizma v usloviakh gipodinamii) B A Chukhlov and S A Burov In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 115-122 12 refs In Russian

Study of the immunity indices in 16 humans subjected to conditions of hypodynamia for a period of 70 days It is found that under conditions of prolonged hypodynamia both the nonspecific antinfection resistance of the organism and the specific immunological reactivity changed These changes can lead to a reinforcement of the activity of conditionally pathogenic and saprophytic automicroflora vegetating in the organism, and can also promote the activation of a latent infection or the spreading of a stimulus introduced from without

A B K

A70-24680 # Functional state of the central nervous system during prolonged hypodynamia (Funktsional'noe sostoianie tsentral'noi nervnoi sistemy pri dlitel'noi gipodinamii) G D Efimenko In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 122-132 20 refs In Russian

Rheoencephalographic study of changes in the central nervous system of humans subjected to conditions of hypodynamia for a period of 75 days Unidirectional shifts in the brain hemodynamics

of all the subjects were noted—namely, a reduction in the vascular hyperemia and tonic tension indices, a reduction in the propagation time of the rheographic wave, and an increase in the lability of the blood regulating nerve centers On survey electroencephalograms of all subjects signs of functional disturbances of the central nervous system characteristic of neurotic states were noted The short-term working capacity of the subjects, in connection with a light, mechanized work, was not reduced during the 75-day period of hypodynamia An analysis of the indices for each subject separately indicates a phase structure in the changes occurring during prolonged hypodynamia

A B K

A70-24681 # Changes in the functioning of the nerve and muscle systems under the action of prolonged hypodynamia (Izmeneniia funktsii nervnoi i myshechnoi sistem pod vlianiem dlitel'noi gipodinamii) A G Panov, V S Lobzin, and V A Beliankin In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 133-147 In Russian

Study of changes in the nervous system in 16 healthy young men subjected to prolonged (up to 70 days) hypodynamia The changes noted are found to occur in stages The initial stage was characterized by early adaptive reactions, while the intermediate stage was characterized by atrophying muscles, primarily those of the shins The third stage (after 20 days of hypodynamia) indicated disturbances of the higher nervous activity troubled sleep, emotional upset, and other asthenic symptoms On the twentieth day, one of the subjects developed an acute neurotic state with an obsessive and overmastering urge to move, thus forcing the experiment to be terminated Oral automatism phenomena and signs of 'pyramidal insufficiency' later appeared in the subjects against a background of an asthenic state These phenomena were expressed in an increase in tendinous and periosteal reflexes in the right extremities, a decrease in the strength of these extremities, a decrease or loss of abdominal and plantar reflexes on the right side, a smoothing of the right nasolabial fold, and a rightward deviation of the tongue This complex of symptoms indicated the development, as a result of the hypodynamia, of an interhemisphere asymmetry with a functional insufficiency of the dominant hemisphere This syndrome was noted in 14 of the 16 subjects After activation of the subjects, a gradual restoration of the functions of the nervous system was observed To prevent these disorders, systematic exercises of the standing and support mechanisms are recommended, as well as predominant physical loading of the left extremities and autogenic training in a psychotonic modification

A B K

A70-24682 # Changes in certain motor functions in humans after prolonged hypodynamia (Izmeneniia nekotorykh dvigatel'nykh funktsii cheloveka posle dlitel'noi gipodinamii) V S Gurfinkel', E I Pal'tsev, A G Fel'dman, and A M El'ner In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 148-161 9 refs In Russian

Study of the effect of prolonged hypodynamia on the preservation of certain motor skills Prolonged hypokinesia is found to lead to a disturbance of motor automatisms (synergies), as manifested by changes in such acts involving the entire organism as standing and walking and changes in the innervation relations based on these acts The methods of physical training employed in the experiments were found to be fairly effective in preventing gross motor disturbances

A B K

A70-24683 # Changes in the biochemical features of walking under the action of hypodynamia according to ichnographic data (Izmenenie biokhimiicheskikh osobennostei khod'by pod vlianiem gipodinamii po dannym ikhnografii) V G Skrypnik In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 161-170 In Russian

Comparative study of the locomotor act in six subjects before and after prolonged bed rest in a reclining position. As a result of this study of walking behavior, data are obtained which indicate a restructuring of the initial walking stereotype. This is expressed in a relative shortening of the length of a double step and in a codimensionality between its constituent elements, and leads to a change in the habitual kinematics of the torso and the extremities, as well as to a disturbance of the ability to maintain a given direction of motion. The use of physical training (a veloergometer and a treadmill) as a preventive measure reduces, but does not eliminate the negative effect of prolonged hypodynamia. During prolonged hypodynamia in a reclining position the use of physical training devices leads to the development of a new stereotype, the stability of which is all the greater, the greater the resemblance between the motions and the load of the motor apparatus under conditions of ordinary locomotor skill and under the conditions of the experiment. This leads to a slowing down of the rate of incorporation into the initial stereotype, but to greater stability in locomotion directly after the experiment. A B K

A70-24684 # State of psychic activity in subjects undergoing prolonged bed rest (Sostoianie psikhicheskoi deiatel'nosti u ispytuemykh pri dlitel'nom sokhraneni postel'nogo rezhima) V P Bogachenko In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 171-174 In Russian

Study of changes in the psychic state occurring in 16 subjects under conditions of strict bed rest. Pronounced changes in the psychic state were found to occur in subjects who were not allowed to perform any physical exercises and did not take any medicines. Less pronounced changes were noted in a group of subjects who performed special sets of physical exercises. In two series of experiments where a complex system of preventive measures was applied practically no changes in the psychic sphere were noted. Forced immobility is regarded as the decisive factor in the development of neuropsychiatric disturbances. A B K

A70-24685 # Stability of psychic functions during prolonged bed rest (Ob ustoiichivosti psikhicheskikh funktsii pri dlitel'nom sokhraneni postel'nogo rezhima) V L Marishchuk, T T Dzhmagarov, Iu K Dem'ianenko, V P Stupnitskii, and B S Khvoinev In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 175-182 15 refs In Russian

Estimation of the stability of psychic functions in subjects experiencing prolonged (70 days) hypodynamia, and investigation of the effectiveness of various methods and means of maintaining this stability. Unfavorable changes in psychic functions were expressed to a lesser degree than vegetative shifts. The subjects generally retained their operator ability, maintaining at the initial level and even exceeding, owing to training, the results of studies characterizing memory, stability, distribution and switching of attention, sensomotor reactions, accuracy of estimating time intervals, ability to do mental work, etc. The small changes noted sometimes tended toward an initial deterioration, with a subsequent increase in the indices, resembling a mobilization of functions similar to an 'alarm

reaction' in a state of stress. These changes were found to be especially pronounced during certain periods when psychopharmacological preparations were used. In groups performing physical exercises unfavorable changes occurred more rarely. A reduction of emotional stability and an increase in wrong actions is attributed to a weakening of a predominantly inhibitory process.

A B K

A70-24686 # Effect of prolonged hypodynamia on the state of the vestibular analyzer (Vlianie dlitel'noi gipodinamii na sostoianie vestibuliarnogo analizatora) K L Khilov, A E Kurashvili, and V P Rudenko In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 182-188 5 refs In Russian

Investigation of the effect of hypodynamia on the functioning of the vestibular analyzer in 16 subjects ranging in age from 21 to 23 years. The excitability of the vestibular analyzer during prolonged hypodynamia was found to increase in a number of cases, a phase structure being observed in the excitability changes. The greatest changes were observed on the seventh, tenth, and twentieth days of hypodynamia in subjects exhibiting asymmetry of the vestibular function before the experiment. A return to active movements after hypodynamia was accompanied by a disturbance of the vestibular function with normalization requiring no less than two to three weeks. It is assumed that during hypodynamia a disturbance of the functioning of both receptors of the vestibular analyzer occurs, although the primary disturbance occurs in the functioning of the otolithic apparatus. Repeated application of the caloric test may be accompanied by pathological phenomena, so that it must be applied with great caution. A B K

A70-24687 # Condition of the visual analyzer during hypodynamia (Sostoianie zritel'nogo analizatora pri gipodinamii) N T Drozdova and O N Nesterenko In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 189-191 In Russian

Investigation of the effects of prolonged hypodynamia on the visual analyzer. These effects consist mainly in a weakening of some visual functions and in a change in the appearance of fundus oculi, and are described in detail. A gradual restoration of the affected functions followed the subjects' return to normal activity. Over an observation period of 20 days, however, no full restoration did take place. M V E

A70-24688 # Physical training of man in conditions of prolonged hypodynamia (Fizicheskaya trenirovka cheloveka v usloviakh dlitel'noi gipodinamii) A V Eremin, V V Bazhanov, V L Marishchuk, V I Stepanov, and T T Dzhmagarov In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 191-199 In Russian

Discussion of the physical fitness of a group of 15 individuals subjected to 70 day bed rest with or without medication or physical exercises. It was found that intermittent physical exercises reduced the negative effects of prolonged bed rest on the performance of various groups of muscles, on static endurance, on the motion coordination during walking, and on psychomotor functions. It is also indicated that exercises on a 'running lane' proved superior to

those on a велоergometer both technically and in terms of prophylactic and emotional effects. The coordination of walking motion was also served better by running lane exercises than by a велоergometer V Z.

A70-24689 # Occlusion training during prolonged hypodynamia (Okkluzionnaya trenirovka v usloviakh dlitel'noi gipodinamii) V G Voloshin, I D Pestov, and B F Asiamolov. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 200-206 17 refs. In Russian.

Consideration of methods for applying inflatable thigh cuffs as means for preventing the unfavorable effects of prolonged hypodynamia on the cardio-vascular system. The operational principle of the device is explained, and its operation in automatically implementing the prescribed occlusion training program is described. The results of performed investigations are reported, and an evaluation of the merits of this prophylactic procedure is given. M.V.E.

A70-24690 # Results of the application of pharmacological preparations in persons subjected to conditions of prolonged hypokinesia (O rezul'tatakh primeneniia farmakologicheskikh preparatov u lits, nakhodivshchikhsia v usloviakh dlitel'noi gipokinezii) P V Vasil'ev and B Iu Lapinskaia. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 206-214 26 refs. In Russian.

Study of the effect of amphetamine, caffeine and securinine on the hypodynamic syndrome of a group of 11 subjects during prolonged hypokinesia. The action of a combination of these preparations on the stability of the subjects during orthostatic tests and transverse G-forces under hypokinesia is investigated. Hypokinesia is found to reduce or even reverse in some cases the stabilizing effect of these preparations on the compensatory-adaptive reactions of the organism. Still, they did generally increase the acceleration and orthostatic stability of the subjects even though with greater functional stresses than in the absence of hypokinesia. V Z.

A70-24691 # Functional state of the nervous system during the aftereffects of hypodynamia (Sostoianie funktsii nervnoi sistemy v period posledeiustviia gipodinamii) G S Kalin and V G Terent'ev. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 214-220. In Russian.

Investigation of the nature and duration of the effects of hypodynamia on the functional condition of the nervous system. A prolonged (70-day) hypodynamia caused in test subjects distinct functional disorders of the nervous system and neuropsychic activity to come into view. These disorders were mainly of the nature of organic microsymptoms, asthenia, vegetative-vascular instability, and akinetic hypotrophy of the shin muscles. The subjects' responses to various tests and their recovery patterns are described. The duration of aftereffects varied from subject to subject and amounted to a timespan between 3 and 4 weeks. M V E.

A70-24692 # Results of a study of the cardiovascular system during the period of aftereffects of a 70-day hypodynamia (Rezultaty issledovaniia serdечно-sosudistoi sistemy v period posledeiustviia 70-sutochnoi gipodinamii) A V Beregovkin, P V Buianov, A V

Galkin, N V Pisarenko, and E E Sheludiakov. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 221-227 5 refs. In Russian.

Discussion of EKGs and hemodynamic tests made on a group of 15 subjects after 70 day exposures to hypodynamia with or without physical exercises and during an orthostatic test. Electrocardiographic studies following exposures indicated changes in the electrocardiac activity and disorders of metabolic processes in the myocardium. The changes observed in the hemodynamic of the subjects indicate disorders in the regulation of the cardiovascular system, and depression of its adaptability to physical loads and orthostatic perturbations. These disorders were more pronounced in the absence of physical exercises. V Z.

A70-24693 # Indices of regional arterial oscillography during hypodynamia (Pokazatel' regionalnoi arterial'noi ostsillografii pri gipodinamii) E G Riabkova and I I Shantyur'. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 228-230. In Russian.

Oscillographic study of the activity of the cardiovascular system of a group of subjects under conditions of restricted motions in a lying position for a long period of time. Artery oscillograms were taken from arms and shins, and also the arterial pressure and the heart beat rates were recorded during the period. Some experiments were conducted under transverse accelerations in a centrifuge. General neuro-circulatory dystonia was established in the subjects after a prolonged hypodynamia. V Z.

A70-24694 # Investigation of orthostatic stability after prolonged hypodynamia (Issledovanie ortostaticheskoi ustoiichivosti posle dlitel'noi gipodinamii) I D Pestov, M I Tishchenko, B A Korolev, B F Asiamolov, V V Simonenko, and A E Baikov. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 230-240 16 refs. In Russian.

Study of the reactions of the cardiovascular system to orthostatic tests in a group of 16 subjects restricted to a lying position for a period of 70 days. EKGs, seismocardiograms or phonocardiograms, sphygmograms and tacho-oscillograms are taken daily during the period. Hemodynamic characteristics, the phase structure of the cycle of the heart and the cardiac activity are determined on the basis of these tests. Prophylactics is discussed to prevent or reduce the negative effects of prolonged hypodynamia on these functions. Possible mechanisms of orthostatic disorders are discussed in connection with the simulation of weightlessness. V Z.

A70-24695 # Changes in g-force tolerance following 70-day hypodynamia (Izmenenie perenosimosti peregruzok posle 70-sutochnoi gipodinamii) A R Kotovskaia, R A Vartbaronov, and S F Simpura. In: Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vlianie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 240-247 11 refs. In Russian.

Investigation of the stability of 12 test subjects to the effects of transverse g-forces before and after a 70-day bed rest. A distinct lowering in tolerance to transverse g-forces was observed after passive bed rest. The administration of pharmaceuticals and of physical exercise during hypodynamia produced an obviously positive effect.

The application of an assortment of prophylactic measures was found to cause a rise in the g-force limit tolerated at hypodynamia's termination, at no substantial lowering in general stability M V E

A70-24696 # Principal results of the investigations of the effect of a 70-day hypodynamia on the human organism (Osnovnye rezul'taty issledovaniy vliyaniya 70-sutochnoi gipodinamii na organizm cheloveka) A M Genin, P A Sorokin, G I Gurvich, T T Dzhmagarov, A G Panov, I I Ivanov, and I D Pestov) In Prolonged immobility and its effect on the human organism (Dlitel'noe ogranichenie podvizhnosti i ego vliyanie na organizm cheloveka) (A70-24665 10-04) Edited by A M Genin and P A Sorokin Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii Volume 13), 1969, p 247-253 8 refs In Russian

Comparison of the experimental results obtained with the hypodynamia consequences expected In the course of the investigation, some new aspects of the effects of prolonged bed rest on the organism came to light lowering of the immunological resistance, certain psychic-function disorders, development of trophic changes in the myocardium, changes in responses to pharmaceuticals, etc The specially developed methods of physical training proved to be the relatively most effective means for reducing the unfavorable consequences of hypodynamia M V E

A70-24700 * Autotrophic and heterotrophic metabolism of *Hydrogenomonas*—Regulation of autotrophic growth by organic substrates Philip E Stukus and B T DeCicco (Catholic University of America, Washington, D C) *Journal of Bacteriology*, vol 101, Feb 1970, p 339-345 23 refs Grant No NGR-09-005-022

The effects of a number of organic substrates on the autotrophic metabolism of *Hydrogenomonas eutropha* were examined Dual substrate (mixotrophic) cultivation in the presence of hydrogen plus either fructose or alanine allowed autotrophic growth to begin immediately after the exhaustion of the organic substrate On the other hand, the presence of acetate, pyruvate, or glutamate caused a lengthy lag to occur before autotrophic growth commenced With acetate or pyruvate this lag (plateau) in the dicyclic growth curve was due to the repression of ribulose diphosphate carboxylase (RDP) synthesis during mixotrophic growth During heterotrophic growth with glutamate, RDP was partially repressed, however, during mixotrophic growth, RDP activity was high Thus the delay of autotrophic growth was not due to a repression of RDP by glutamate The data suggest that glutamate interferes with autotrophic metabolism by repressing the incorporation of inorganic nitrogen The repression of these vital autotrophic functions by acetate, pyruvate, and glutamate occurred both in the presence and absence of hydrogen, i.e., during both heterotrophic and mixotrophic cultivation The derepression of the affected systems during the plateau phase of the dicyclic growth curves was demonstrated Carbon dioxide assimilation by whole cells agreed well with the RDP activity of extracts from cells grown under similar conditions (Author)

A70 24710 Attention and performance II, *Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29 August 2, 1968 Symposium sponsored by the Institute for Perception Research Edited by W G Koster (Institute for Perception Research, Eindhoven, Netherlands) Amsterdam, North-Holland Publishing Co., 1969 452 p \$19 60

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Physiological basis of reaction time

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A70-24711 Speed and accuracy of movement and their changes with age A T Welford (Cambridge University, Cambridge, England), A H Norris, and N W Shock (Baltimore City Hospitals, Baltimore, Md.) In Attention and performance II, *Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research Edited by W G Koster Amsterdam, North-Holland Publishing Co., 1969, p 3-14, Discussion, R W Pew (Michigan, University, Ann Arbor, Mich.), R S Nickerson (Bolt Beranek and Newman, Inc., Cambridge, Mass.), and J F Schouten, p 15 18 refs

An experiment on the speed and accuracy of movement is reported in which subjects tapped to-and-fro with a pencil between two targets drawn on paper The time taken was found to vary approximately, as in previous studies, with the logarithm of the ratio

between the distance apart of the targets and their width. However, when speed was related to the actual scatters of shots on the targets instead of to the target widths, the results showed systematic and consistent departures from a linear relationship with the logarithm of the ratio between distance apart and the width of scatter. Two modifications to the formulation are discussed, one of which takes account of possible tremor effects, and the other of the possibility that visual control when 'homing' on a target may be slower than the control of movement designed to cover a given distance. Both modifications gave good fits to the observed results, but the second is preferred on grounds of consistency with the findings of other studies. The general pattern of results was followed for subjects in each decade of age from the twenties to the seventies. Performance improved in certain ways from the twenties to the thirties and forties, and thereafter declined with age. (Author)

A70-24712 * The speed-accuracy operating characteristic. Richard W. Pew (Michigan, University, Ann Arbor, Mich.) In *Attention and performance II*, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 16-26, Discussion, Patrick Rabbitt (Oxford University, Oxford, England), A. F. Sanders (Instituut voor Zintuigfysiologie RVO TNO, Soesterberg, Netherlands), and J. F. Schouten, p. 26. 7 refs. Contracts No. NASr-54(06), No. AF 49(638)-1235.

An analysis of the relationship between speed and accuracy of performance under a wide variety of task conditions reveals a linear relationship between log odds in favor of a correct response and reaction time. This result is consistent with the conceptual logic of the statistical decision model of choice reaction time and suggests the definition of a speed-accuracy operating characteristic analogous to the receiver operating characteristic in signal detection. (Author)

A70-24713 The probability of a signal as a determinant of reaction time. E. P. Krinichik (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). In *Attention and performance II*, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 27-36. 18 refs.

Two series of experiments have been compared, this has enabled us to establish the dependence of the reaction time on the signal probability ($p = 1, 1/2, 14/15, 1/15$) in the case of a simple reaction ($n = 1$) and a choice reaction ($n = 2, 4, 8$). It was found that the character of the dependence of the RT on the signal probability remains essentially the same in all the experimental conditions. An increase of the number of signals leads only to a change in the quantitative parameters of this dependence. From similar results obtained in experiments with one signal and in experiments with a choice from among 2, 4 or 8 signals, it may be concluded that the character of the dependence of the RT on the signal probability is determined by the particular temporal structure of the signal presentation, i.e., the 'time morphology' of the set of signals. However, an analysis of the 'sequential effects' did not reveal any regular change in the RT to a particular signal with an increase in the interval between two presentations of the signal, or with an increase in the number of its repetitions. This fact indicates that the behavior of man in the conditions under investigation is determined not only by the structure of the objective influences which change the level of the physiological reactivity of the sensorimotor system, but also by the strategy developed by man on the basis of a subjective probabilistic model of the situation. (Author)

A70-24714 The information hypothesis and non-repetitions. Ray Hyman (Oregon, University, Eugene, Ore.) and Carlo Umiltà (Bologna, Università, Bologna, Italy). In *Attention and*

performance II, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 37-53. 7 refs.

Experimental confrontation between Hyman's information hypothesis and Kornblum's repetition hypothesis, both concerning the reaction time in subjects to stimulus informations, under conditions more ideal than those provided by either Hyman or Kornblum. The experimental method selected is described, and the results obtained are tabulated, plotted graphically and discussed. They appear to be more compatible with Hyman's information hypothesis, and suggest that a fruitful way to study the microstructure of choice reaction time is to isolate the factors that differentiate situations in which the information hypothesis holds from those in which it does not. O. H.

A70-24715 Payoff and the refractory period. John Annett (Hull, University, Hull, Yorks, England). In *Attention and performance II*, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 65-71, Discussion, p. 72-74. 7 refs. Research supported by the Department of Scientific and Industrial Research.

Investigation of the delays in reaction time ('refractory periods') to the second stimulus (S2) in subjects who were delivered two successive stimuli (S1 and S2) at short interstimulus intervals (ISI). An experiment is described in which subjects were given explicit numerical payoffs and minimum ISIs and ISI ranges were varied between subjects and between sessions. The results obtained are plotted graphically, tabulated, and discussed. O. H.

A70-24716 From reaction time to the measuring of promptness. Damian Kovač (Slovenska Akademia Vied, Ústav Experimentálnej Psychologie, Bratislava, Czechoslovakia). In *Attention and performance II*, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North Holland Publishing Co., 1969, p. 75-83. 18 refs.

A review is presented of the Institute's major studies on this subject, including the effect of intensity of pressing, coordination, load, age, laterality, command of languages. On the basis of the present state of research on reaction, response, and decision time, the introduction of the term 'promptness' embodying both the quantitative and the qualitative aspects of the corresponding behavior, is suggested and advocated. (Author)

A70-24717 The simple reaction time as an aid in determining the sign of a visual transient response. G. H. Mowbray and Joseph F. Bird (Johns Hopkins University, Silver Spring, Md.). In *Attention and performance II*, Proceedings of the Donders Centenary Symposium on Reaction Time, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 84-94, Discussion, R. W. Pew (Michigan, University, Ann Arbor, Mich.) and J. F. Schouten, p. 94, 95. 12 refs. PHS Grant No. NB-07226, Contract No. N0w-62-0604-c.

A visible transient response at frequencies above fusion is described. The polarity of the response, as subjectively determined, is found to depend upon the order in which two alternating but fused light trains of different frequency are presented. The results of a transient threshold test and a simple reaction time test confirm the

subjective determination. The implications of these results for models of flicker-fusion frequency mechanisms are discussed.

(Author)

A70-24718 The effects of recency and repetition on recall latencies Nancy C. Waugh (Harvard University, Boston, Mass.) In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 115-125, Discussion, E. T. Welford (Cambridge University, Cambridge, England), p. 125. 11 refs.

The time that it takes an individual to remember a specific item of verbal information was measured. The data indicate that recall latencies vary both with the interval since the item was initially stored in memory and with the number of times it has been retrieved therefrom, being shortest for items that are very recent or very familiar. The significance of these results for a general description of short-term memory is discussed.

(Author)

A70-24719 The time-course of preparation—Confirmatory results with visual and auditory warning signals Paul Bertelson and Françoise Tisseyre (Bruxelles, Université Libre, Brussels, Belgium). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 145-154. 15 refs. Research supported by the Fonds de la Recherche Fondamentale Collective.

In a previous experiment (Bertelson, 1967) an auditory warning signal occurring in a high time-uncertainty situation produced an acceleration of the choice reaction to a visual stimulus which followed it by a predictable interval. The experiment has been replicated with the same click as warning signal in one condition, and with a visual signal, a flash, in the other. The facilitating effects of the flash lag behind those of the click, but they are observed for all positive intervals and are significant from 70 msec onwards. The previous conclusion that a warning signal can be used as a time cue without starting a refractory period was thus not restricted to the particular signal which had been used so far. A consequence is that the current tendency to take the situation of a reaction stimulus prefaced by a no reaction stimulus as the standard condition in which to study refractoriness should be considered with caution.

(Author)

A70-24720 Grouping and refractoriness in multiple selective responses A. F. Sanders (Instituut voor Zintuigfysiologie RVO-TNO, Soesterberg, Netherlands) and P. J. G. Keuss (Amsterdam, Vrije Universiteit, Amsterdam, Netherlands). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 177-194, Discussion, J. C. Falmagne (Bruxelles, Université Libre, Brussels, Belgium), Patrick Rabbitt (Oxford University, Oxford, England), Sylvan Kornblum (Michigan, University, Ann Arbor, Mich.), and M. I. Posner (Oregon, University, Eugene, Ore.), p. 194. 18 refs.

Some experiments are described on selective reactions to a varying number (1-4) of successively presented signals. In one set of conditions, Ss were instructed to handle signals in strict succession, while in another set, Ss were asked to give one multiple response after all signals had arrived (grouping). The results showed that both instructions could be well obeyed, but striking differences in performance were found between grouping and successive handling. In the case of the latter strategy, response time to a signal was

considerably reduced when the prior one was covert, especially at short intersignal intervals. In grouping, response time was not dependent on covert or overt previous reaction. Here a relatively strong increase of response time was found when going from a single reaction to two reactions but longer sequences had no sizeable effect on response time. This is explained in terms of a difference in readiness to respond between a single and a grouped reaction. Less readiness to respond also seems to occur at later signals of the sequence in the successive handling conditions, especially at long intersignal intervals, which may explain some deviations of the Welford-Davis model.

(Author)

A70-24721 The influence of intensity of visual stimuli on the psychological refractory phase W. G. Koster and J. B. Peacock (Institute for Perception Research, Eindhoven, Netherlands). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 232-252, Discussion, A. F. Sanders (Instituut voor Zintuigfysiologie RVO-TNO, Soesterberg, Netherlands), Patrick Rabbitt (Oxford University, Oxford, England), and R. S. Nickerson (Bolt Beranek and Newman, Inc., Cambridge, Mass.), p. 252. 253. 36 refs.

The paper describes some experiments designed to test the predictions of an intermittency hypothesis concerning the influence of stimulus intensity on the delay in reaction to the second of a pair of visual stimuli. No agreement has been found between the experimental data and the predictions. A variant of the intermittency hypothesis is proposed in which the central system is not assumed to handle information on an all-or-none basis, but rather on the basis of a reduced sensitivity to new information; the sensitivity is assumed to be minimal immediately after the passage of a stimulus and is gradually restored to its initial value. Some psychophysical and neurophysiological evidence is given.

(Author)

A70-24722 * 'Same'-different' response times—A model and a preliminary test Raymond S. Nickerson (Bolt Beranek and Newman, Inc., Cambridge, Mass.). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 257-275. 6 refs. Contract No. NAS 2-2676.

Based on previous work by Stone (1960), McGill (1963), Sekuler (1965), and Bindra, Williams and Wise (1965), a model is presented for predicting the results to be expected when subjects are required to decide whether two successively presented stimuli are the same or different. The model assumes a 'counter' for cumulating 'difference' information, and a 'clock' for keeping time. The subject sets both a count criterion and a time criterion in accordance with stimulus and payoff parameters. The decision rule is: if the count criterion is exceeded before the time criterion, decide 'different,' otherwise decide 'same.' The results of a preliminary experiment are presented in which an attempt was made to test some of the model's implications with respect to the relationships between response times associated with correct and incorrect 'same' and 'different' decisions.

(Author)

A70-24723 The discovery of processing stages—Extensions of Donders' method Saul Sternberg (Bell Telephone Laboratories, Inc., Murray Hill, N.J.). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70-24710 10-05) Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 276-314, Discussion, p. 314. 315. 52 refs.

A method is proposed for using reaction-time (RT) measurements to study stages of information processing. It overcomes limitations of Donders' and more recent methods, and permits the discovery of stages, assessment of their properties, and separate testing of the additivity and stochastic independence of stage durations. The main feature of the additive-factor method is the search for noninteracting effects of experimental factors on mean RT. The method is applied to several binary-classification experiments, where it leads to a four-stage model, and to an identification experiment, where it distinguishes two stages. The sets of stages inferred from both these and other data are shown to carry substantive implications. It is demonstrated that stage-durations may be additive without being stochastically independent, a result that is relevant to the formulation of mathematical models of RT. (Author)

A70-24724 Some data on neurophysiological processes involved in the preparatory motor activity to reaction time performance. Jean Requin (CNRS, Institut de Neurophysiologie et Psychophysiologie Generale, Marseille, France). In *Attention and performance II, Proceedings of the Donders Centenary Symposium on Reaction Time*, Eindhoven, Netherlands, July 29-August 2, 1968 (A70 24710 10-05). Symposium sponsored by the Institute for Perception Research. Edited by W. G. Koster. Amsterdam, North-Holland Publishing Co., 1969, p. 358-367, Discussion, Brunia, p. 367. 7 refs.

This study is concerned with an analysis of monosynaptic reflexes during the foreperiod in a simple reaction time situation. There is a dissociation in direction, time course and correlation with motor efficiency of the changes of excitability of the spinal structures controlling the muscles involved and not involved in the motor response, respectively the inhibition of reflexes observed in the involved muscle is more predictive for the performance level and more sensitive to the effect of probability of occurrence of the signal to respond to than the augmentation of reflexes observed in the noninvolved muscle. The significance and the neurophysiological mechanism of this inhibition are discussed. (Author)

A70-24725 Basic radiation protection. Principles and organization. C. W. Easley (TRW Systems Group, Redondo Beach, Calif.). New York, Gordon and Breach Science Publishers, Inc., 1969. 134 p. 14 refs. \$12.50.

A simplified description of radioactivity and a basic information as to radiation hazard is first given, followed by a discussion of basic principles of radiation and its detection and measurement. Various types of monitoring instruments are reviewed and compared, and their proper selection is explained. Biological effects, permissible doses, levels and concentrations of radiation to man, as well as permissible contamination levels and problems of contamination control, are examined in detail. A theory of basic principles of contamination and decontamination is presented, and characteristics of surfaces, useful decontaminating agents, and methods of personnel decontamination are discussed. In addition, air sampling methods to determine atmospheric contamination are described. A detailed attention is given to the nature, production, and absorption of X rays representing probably the greatest radiation hazard, as well as to neutron radiation. Finally, criteria and methods of waste disposal are discussed. O. H.

A70-24736 Photogrammetry as a tool of experimental structural mechanics. Robert H. Brock (New York, State University, Syracuse, N. Y.), Benjamin A. Wasil (Syracuse University, Syracuse, N. Y.), and Lee Uhrig Bender (Ohio State University, Columbus, Ohio). In *American Society of Photogrammetry, Annual Meeting*, 36th, Washington, D. C., March 1-6, 1970, Technical Papers (A70 24726 10-13). Falls Church, Va., American Society of Photogrammetry, 1970, p. 247, 248.

Brief description of the photogrammetric procedures used to carry out experiments in structural mechanics during the past several years at Syracuse University. The latest experiment, which uses a standard Balplex 525 Plotter as a camera system, is described in detail. Fiducials are placed on the unexposed photographic plates with the aid of the Balplex Centering Device and subsequently both the control field and the undeflected and deflected objects are registered on the diapositive. The imagery is measured with a Mann Comparator and the displacement vectors are computed using a Brown Type Algorithm. Advantage is taken of a 100 point control field to form a model deformation surface for use in conjunction with the undeflected and deflected imagery. M. M.

A70-24766 Perceptual selection and integration. A. T. Welford (Adelaide, University, Adelaide, Australia). *Ergonomics*, vol. 13, Jan. 1970, p. 523-77. 77 refs.

Discussion of the broad principles of selection and integration considered separately, as well as their combined general implications. Perception involves both a selection from, and an integration of, the data conveyed to the brain from the sense organs. Selection seems to be made in terms of both simple sensory qualities and more complex semantic aspects of incoming data, and appears to result in unwanted data being in a very real sense attenuated. It is achieved at some cost, as is shown by the fact that selection commonly takes a time which increases with the degree of specificity to which it is carried. Research results do not fully agree on the extent to which different features of incoming data are selected simultaneously or successively. Perceptual integration appears to achieve economy of decision in the sense that it makes it possible for a large quantity of incoming data to be handled as a limited number of units. Of the various ways in which this is achieved, the extraction of rates of change and of time-sequences, the imposition of schemata or templates from past experience, and the building of perceptual frameworks in both space and time are considered. M. M.

A70-24767 Evidence for an accumulator model of psychophysical discrimination. D. Vickers (Adelaide, University, Adelaide, Australia). *Ergonomics*, vol. 13, Jan. 1970, p. 37-58. 64 refs. Research supported by the Research Grants Council of Australia.

Recent theoretical approaches to the problem of psychophysical discrimination have produced what may be classified as 'statistical decision' or 'data accumulation' models. While the former have received much attention their application to judgment and choice meets with some difficulties. Among the latter, the two types which have received most attention are a 'runs' and a 'recruitment' model, but neither seems able to account for all of the relevant data. It is suggested instead that an 'accumulator' model, in which sampled events may vary in magnitude as well as probability, can be developed to give a good account of much of the available data on psychophysical discrimination. Two experiments are reported, in which the subject presses one of two keys as soon as he has decided whether the longer of two simultaneously presented lines is on the left or right. Results are found to be inconsistent with a runs or recruitment process, but to accord well with predictions from the accumulator model. Other evidence consistent with such a mechanism is briefly reviewed. (Author)

A70-24768 A psychophysical metric for visual space perception. R. B. Freeman, Jr. (Pennsylvania State University, University Park, Pa.). *Ergonomics*, vol. 13, Jan. 1970, p. 73-81. 19 refs. PHS Grants No. MH-08856, No. MH-10691.

A new psychophysical metric is proposed for the measurement of visual cues in space perception. Its application to the discrimination of distance by means of binocular disparity, monocular movement parallax and linear perspective is discussed.

Experiments are described in which the validity of the proposed psychophysical metric is tested in relation to judgments of visual slant and shape (Author)

A70-24769 Some aspects of the selective process in the functional visual field A F Sanders (RVO-TNO, Institute for Perception, Soesterberg, Netherlands) *Ergonomics*, vol 13, Jan 1970, p 101-117 27 refs

A review is given of a group of experiments on performance as a function of display angle, aiming at a description of the perceptual strategies used with signals at various angular separations. The first experiments were carried out using a simple four-choice discrimination task. The results show a non-linear decrease of performance as a function of display angle, which proved to be related to the necessity of making eye and head movements when shifting from one signal source to the other. It is suggested that the non-linearity is due to changes of strategy and a preliminary theory about selective processes is formulated and tested in a number of tasks (Author)

A70-24770 A theory of pattern perception based on human physiology M Kabrisky, O Tallman (USAF, Wright Patterson AFB, Ohio), C M Day (USAF, Institute of Technology, Wright Patterson AFB, Ohio), and C M Radoy (USAF, Cambridge Research and Development Center, Lexington, Mass) *Ergonomics*, vol 13, Jan 1970, p 129-147 14 refs

Extension of a previous pattern-recognition model enabling it to perform pattern recognition by computing the two-dimensional Fourier transform of input images in a manner isomorphic to computation of the Fraunhofer diffraction pattern. It is shown that the use of the Fourier transform of an unknown pattern in a subsequent correlation scheme results in a pattern recognition system which is not easily faulted by the small local mutilations of input patterns which badly compromise straight correlation pattern recognition schemes M M

A70-24771 The perception of symbols for machine displays R S Easterby (Birmingham, University of Aston, Birmingham, England) *Ergonomics*, vol 13, Jan 1970, p 149-158 20 refs

The role of pattern perception theory based on the Gestalt view of perception is discussed in relation to the practical design of symbols for machine displays. Experimental studies of discrimination and apprehension of meaning of symbols are reviewed, and some recommended perceptual principles important to symbol design are summarized (Author)

A70-24772 Facilitated diffusion of oxygen in the presence of hemoglobin F Kreuzer and L J C Hoofd (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands) *Respiration Physiology*, vol 8, Mar 1970, p 280-302 42 refs

The basic equations for the simultaneous diffusion and chemical reactions of oxygen and hemoglobin in a film at steady state were solved assuming that the total oxygen flux was the sum of the flux by plain diffusion and that by diffusion of oxyhemoglobin. After collecting and scrutinizing the pertinent numerical data, particularly for the diffusion coefficients of oxygen and hemoglobin, numerical solutions were obtained by computer for a variety of conditions. It appeared that the gradients of oxygen and oxyhemoglobin across the slab were notably different from those stipulated for the condition of chemical equilibrium. In particular we found that there must be a minute step in the oxygen gradient at the low pressure side with a slope equal to that at the high pressure side because of the boundary condition that the two surfaces must be impermeable for hemoglobin, and that the saturation is higher at the low pressure side and lower at the high pressure side than at chemical equilibrium. When assuming mean values from available data for the diffusion coef-

ficients of oxygen and hemoglobin we arrived at excellent agreement between the computed fluxes and those obtained experimentally by other authors. It is concluded that the facilitation of oxygen diffusion in the presence of hemoglobin can be described quantitatively when the chemical reactions are taken into account (Author)

A70-24773 Effect of body temperature on the ventilatory response to exercise Brian J Whipp (Harbor General Hospital, Torrance, Calif) and Karlman Wasserman (California, University, Los Angeles, Calif) *Respiration Physiology*, vol 8, Mar 1970, p 354-360 24 refs PHS Grants No HE-11905, No HE-11907

The mechanisms by which pulmonary ventilation increases during exercise are poorly understood. It has been suggested that increasing body temperature may play an important role in the exercise hyperpnea. Eight subjects were studied at progressively increasing work rates to fatigue on two nonconsecutive days. On one day, the subjects were normothermic and on the other day the subjects were hypothermic during the control period of the exercise. Hypothermia was induced by a 90 minute cold shower. The average reduction in body (rectal) temperature resulting from the cold shower was 1.1 deg C. Metabolic responses to the test were similar whether the subject began the exercise in a normothermic or hypothermic state. Pulmonary ventilation during the tests increased in proportion to the level of carbon dioxide production and was independent of the level of body temperature. This suggests that body temperature is not an independent stimulus to ventilation during exercise (Author)

A70-24774 Respiration of man during exercise at high altitude—Highlander vs lowlander S Lahiri, F F Kao, T Velasquez, C Martinez, and W Pezzia (New York, State University, Brooklyn, N.Y., Lima, Universidad Nacional, Lima, Peru) *Respiration Physiology*, vol 8, Mar 1970, p 361-375 23 refs Research supported by the Health Research Council of the City of New York, NIH Grants No FR-5401, No H-04032, No HE-06375

The regulation of pulmonary ventilation during exercise was investigated in five high altitude natives (HN) and five sea level natives (SN) acclimatized to 4540 m. At ambient oxygen pressure (83 torr), HN ventilated 10-20% less than SN. Hypercapnic and nonchemical work stimuli produced similar additive ventilatory effects in HN and SN. The oxyc slopes of ventilation vs alveolar carbon dioxide pressure response line, which were independent of work level, were also similar in the two groups. During hypoxic exercise, the slopes of the ventilation vs alveolar carbon dioxide pressure response increased, the increment being greater at higher work rates. This interaction between hypoxia and nonchemical work stimuli in HN was, however, a third or less of that in SN. Thus, we conclude that in the regulation of ventilation in HN and SN during exercise, the hypercapnic and nonchemical work stimuli played similar roles but that the relatively insensitive peripheral chemoreflex in HN resulted in a diminished interaction between the hypoxic and work stimuli (Author)

A70-24868 Adrenocortical secretory function—Communications and control aspects J Urquhart, R L Krall, and C C Li (Pittsburgh, University, Pittsburgh, Pa) *Automatica*, vol 6, Mar 1970, p 193-205 22 refs NIH Grant No GM 14637

Investigation of the stimulatory effect of the pituitary hormone, ACTH, on the secretion of the steroid hormone, cortisol, by the canine adrenal cortex. In examining the dynamics of this hormonal action, a seventh order state variable model of this process was developed in terms of current knowledge about the mechanisms of cortisol biosynthesis. The modeling plays a dual heuristic role: first, at the very least, it provides a phenomenological description of adrenocortical secretory function for use in larger models of pituitary-adrenal control mechanisms, and, secondly, it is an aid in

evaluating postulated mechanisms by which ACTH acts on the kinetic parameters of cortisol biosynthesis. The experimental results are summarized. They represent a set of nonlinear conservation equations whose state variables can be related to the biochemical theory and whose parameters were selected by cut-and-try fitting with an analog computer against the few constraints now known.

O H

A70-24934 His bundle electrograms in two cases of Wolff-Parkinson-White (pre-excitation) syndrome. Agustin Castellanos, Jr., Eduardo Chapunoff, Cesar Castillo, Orlando Maytin, and Louis Lemberg (Miami, University, U S Veterans Administration Hospital, Jackson Memorial Hospital, Miami, Fla.) *Circulation*, vol 41, Mar 1970, p 399-411. 20 refs.

The catheter technic for recording the electrical activity of the specialized conducting system in the human heart showed in two patients studied that ventricular pre-excitation was apparently due to a bypass of the His bundle. Intermediate forms of WPW complexes appeared to be combination beats resulting from the activation of the ventricles through impulses traversing both the His bundle and accessory communications. Preferential iatrogenic activation of an intra atrial (and perhaps even of an atrioventricular) tract appeared to occur in one of the patients. The patients with the WPW (pre-excitation) syndrome and long histories of paroxysmal arrhythmias were successfully treated with a combination of oral propranolol and implanted (transvenous) demand pacemaker.

(Author)

A70-24935 Morphology of the human mitral valve I—Chordae tendineae. A new classification. J H C Lam, N Ranganathan, E D Wigle, and M D Silver (Toronto, University, Toronto General Hospital, Toronto, Canada) *Circulation*, vol 41, Mar 1970, p 449-458. 23 refs. Research supported by the Ontario Heart Foundation and the Medical Research Council of Canada.

Chordae tendineae from 50 normal mitral valves were studied. Four main types can be distinguished by their mode of insertion. Commissural chordae insert into and define the commissures between the anterior and posterior leaflets. Rough zone chordae insert into the ventricular aspect of the distal rough portion of the anterior and posterior leaflets. Such rough zone chordae typically split into three cords before inserting into the leaflet. Two of the anterior leaflet rough zone chordae are thicker than the others and are called strut chordae. They insert at 4 and 8 o'clock positions on the semicircular anterior leaflet. Cleft chordae insert into and define the clefts between the scallops of the posterior leaflet. Basal chordae are single strands that arise from the posterior ventricular wall and insert into the basal zone of the posterior leaflet. This classification permits a clear definition of mitral valve anatomy and forms a sound basis for functional studies of chordae tendineae.

(Author)

A70-24936 Morphology of the human mitral valve. II—The valve leaflets. N Ranganathan, J H C Lam, E D Wigle, and M D Silver (Toronto, University, Toronto General Hospital, Toronto, Canada) *Circulation*, vol 41, Mar 1970, p 459-467. 25 refs. Research supported by the Ontario Heart Foundation and the Medical Research Council of Canada.

Fifty normal mitral valves from adults were studied. Commissures, identified by commissural chordae tendineae and the tips of papillary muscles, partition the mitral valvular tissue into anterior and posterior leaflets. This definition incorporates into the posterior leaflet the structures formerly regarded as accessory leaflets. The posterior leaflet is further divided into scallops by clefts in its tissue. Cleft chordae provide a guide to these interscallop indentations or clefts. Partitioned this way, the posterior leaflet was tri-scalloped in 46 hearts. In 42, a large middle scallop was present with two smaller scallops on either side. Rough and clear zones can be defined on the anterior leaflet and rough, clear, and basal zones on the posterior leaflet.

(Author)

A70-24937 Left ventricular systolic time intervals as indices of postural circulatory stress in man. R W Stafford, W S Harris, and A M Weissler (Ohio State University, Columbus, Ohio) *Circulation*, vol 41, Mar 1970, p 485-492. 38 refs. Research supported by the Central Ohio Heart Association, PHS Grants No HE-5546, No HE-5786, No HE-06737.

The effects of graded increments of passive head-up tilt on the duration of the systolic time intervals corrected for heart rate were investigated in 15 normal subjects. Head-up tilt caused a prolongation of the pre-ejection period and a shortening of the left ventricular ejection time, while total electromechanical systole diminished minimally. The lengthening of the pre-ejection period and abbreviation of the left ventricular ejection time increased progressively with stepwise increments of head-up tilt. The application of venous occlusive tourniquets produced changes in the systolic intervals directionally similar to those observed with head-up tilt. In contrast to the normal subjects, three patients with congestive heart failure demonstrated no change in the systolic time intervals during head-up tilt. After diuresis in two of the patients with heart failure, the responses of their systolic time intervals to head-up tilt returned toward normal.

(Author)

A70-24938 * Ultrasonic cardiac echography for determining stroke volume and valvular regurgitation. Richard L Popp and Donald C Harrison (Stanford University, Palo Alto, Calif.) *Circulation*, vol 41, Mar 1970, p 493-502. 20 refs. Research supported by the American Heart Association, NIH Grants No HE-570903, No HE 586601, No HE-5107-15, No HE 905805, Grant No NGR-05-020-305.

The ventricular dimensions of 51 patients with heart disease were determined by ultrasonic echography during cardiac catheterization. These data were used to calculate end-diastolic and end-systolic volumes and stroke volume, using a prolate ellipse as a geometric model of the left ventricle. In 30 patients without valvular regurgitation the stroke volumes determined by the echographic method were compared with those determined simultaneously by the standard Fick method with a correlation coefficient of $r = 0.966$. In 21 patients with valvular regurgitation, the severity of regurgitation was estimated by comparing the forward stroke volume determined by the Fick method with the total left ventricular stroke volume determined by the echographic method. These calculations of regurgitation correlated reasonably well with the degree of valvular regurgitation estimated from angiocardiographic study. It is suggested that these echographic determinations of stroke volume are an atraumatic, safe, and acceptable method in patients without valvular regurgitation. Moreover, these preliminary studies suggest that the severity of valvular regurgitation can be estimated by utilizing ultrasound echocardiography.

(Author)

A70-24939 Cardiac performance after diagnostic coronary arteriography. Maurice J Raphael (Royal Postgraduate Medical School, London, England), Shahbudin H Rahimtoola, and Gerald T Gau. *Circulation*, vol 41, Mar 1970, p 537-544. 27 refs.

Description of cardiac performance following diagnostic coronary arteriography in patients with heart disease and in dogs. No significant change in cardiac output, heart rate, stroke volume, hemoglobin, hematocrit, and mean systemic arterial pressure compared to data obtained before diagnostic coronary arteriography was found in 19 patients. Left ventricular filling pressure and mean pulmonary artery pressure increased temporarily. In four dogs, selective left coronary arteriography resulting in increased ventricular filling pressure, was accompanied by an increase of left ventricular end-diastolic and stroke volumes. The results obtained in the investigations demonstrate that there is a temporary depression of left ventricular function. It is suggested that the left ventricle utilizes the Frank-Starling mechanism to maintain adequate circulation. G R

A70-24940 The prognosis of an abnormal electrocardiographic stress test Joseph T Doyle and Sandra H Kinch (Albany Medical College, New York State Department of Health, Albany, N Y) *Circulation*, vol 41, Mar 1970, p 545-553 18 refs

Discussion of investigations concerned with the frequency with which ischemic heart disease (IHD) can be inferred from arbitrary electrocardiographic (ECG) criteria in middle-aged men subjected to a moderately stiff exercise test. It was found that relatively insensitive but highly specific and reproducible ECG criteria accurately identify men with clinically silent but far-advanced coronary atherosclerosis, attested by the poor prognosis of an abnormal response. An abnormal postexercise ECG is valid evidence of IHD. A submaximal ECG stress test is useful in clinical and epidemiologic studies and might be useful in assessing the effectiveness of efforts to reduce the risk of IHD. G R

A70-25076 Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969 187 p In German \$13.20

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On the evaluation of partial oxygen pressure in the hyperaemic earlobe capillary blood in hypoxemic conditions (Zur Beurteilung des Sauerstoffpartialdruckes aus dem hyperamisierten Ohracapillarsblut bei hypoxämischen Zuständen) F H Hertle, D Kafarnik, and W Schmidt (Mainz, Universität, Mainz, West Germany), p 120-124 23 refs (See A70-25088 10-04)

A70-25077 Physiology of oxygen transport and pathophysiology of tissue hypoxia (Physiologie des Sauerstofftransportes und Pathophysiologie der Gewebshypoxie) G Thews (Mainz, Universität, Mainz, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 1-11 13 refs In German

Discussion of theoretical principles of oxygen transport in human organism, and the genesis of tissue hypoxia. It is shown that oxygen uptake of the organs is dependent upon the ventilation and gas exchange in the lung, the transport characteristics of the blood, and the local blood flow and diffusion conditions in the tissue. Each of these factors can contribute to the genesis of tissue hypoxia. The arterialization effect in the lung is determined by the ventilation-perfusion, and the diffusion capacity-perfusion relationships. The transport characteristics of the blood are dependent upon its O₂ combining capacity and O₂ affinity. The capillary blood flow, and the regional diffusion conditions are the decisive factors with respect to supply conditions in the individual tissues. The diffusion conditions in the brain and the heart are more closely examined, as examples of the principles of oxygen supply and the mechanism of the deficiency effects. O H

A70-25078 Hypoxia caused by disturbances in the function of the lung (Hypoxie durch Störungen der Lungenfunktion) W Lochner (Düsseldorf, Universität, Düsseldorf, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 12-17 In German

Discussion of four major disturbances in the function of the lung which may result in hypoxia, i.e., alveolar hypoventilation, arterio-venous admixing (shunt), disturbance in blood distribution, and oxygen diffusion disturbances. The characteristics of these disturbances are described, and causes of their origin are discussed and summarized. O H

A70-25079 Physiology and pathophysiology of oxygen transport in blood (Physiologie und Pathophysiologie des Sauerstofftransportes im Blut) J Grote (Mainz, Universität, Mainz, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 18-34 70 refs In German

Discussion of the physiological nature of the oxygen transport capacity of human blood. It is shown that this capacity is determined by the O₂ capacity and O₂ affinity. Both values undergo physiological fluctuations during the course of life, in case of illness, these

variations can impair the oxygen supply of the organism to a very considerable extent. While changes in the O₂ capacity of the blood have a direct influence on the oxygen transport capacity, an increase in the O₂ affinity leads to an improvement in the conditions for oxygen uptake in the lung, on the other hand, however, to a deterioration in the conditions for oxygen removal. Although a reduction in the O₂ affinity of the blood makes oxygen removal in the tissues easier, it also makes a complete saturation of the blood with oxygen more difficult. O H

A70-25080 Critical oxygen supply of the brain (Die kritische Sauerstoffversorgung des Gehirns). D W Lubbers (Marburg, Universität, Marburg an der Lahn, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 35-42 20 refs In German

Examination of the critical oxygen supply of the cerebral mitochondria and the intercapillary oxygen transport. Mitochondrial suspensions at maximal oxygen turnover show a critical partial oxygen pressure of 2 mm Hg. It is shown that the critical oxygen pressure depends on the concentration of the cytochrome oxidase system. Since this concentration in the body is about two to three times as high as necessary for maximal oxygen capacity of an organ, the effective critical oxygen pressure of mitochondria within the tissues is about 1 mm Hg or even less. The critical venous oxygen tension of the brain is 18 mm Hg. Capillary structure and direction of bloodflow are the factors determining the best utilization. As compared to experimental models, the arrangement of capillaries in form of axymmetric networks guarantees optimal oxygen supply. O H

A70-25081 Critical oxygen supply of the heart (Die kritische Sauerstoffversorgung des Herzens). S Schuchhardt (Marburg, Universität, Marburg an der Lahn, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 43-48 7 refs In German

Discussion of the aerobic metabolism of the heart muscle cells and the oxygen utilization of the coronary artery blood. It is shown that heart muscle cells are adjusted to aerobic metabolism structurally and functionally, and utilize available oxygen even at lowest partial pressures as much as possible. The rhythmic changes of the energy metabolism caused by the action of the heart are buffered within the heart muscle cell so that the oxygen consumption in the cytochrome oxidase system is in steady state. The oxygen utilization from the coronary artery blood is limited because of high oxygen consumption of the myocardium despite the well developed capillaries of the heart. O H

A70-25082 Biochemical consequences of anoxia (Biochemische Folgen der Anoxie). H Langendorf (Mainz, Universität, Mainz, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 49-54 In German

Discussion of the effects of anoxia on biochemical processes in the human body. The balances of chemical energy are compared under aerobic and anaerobic conditions. It is shown that the main problem of the anoxic tissue consists in a radical restriction in the production of chemically utilizable energy. In conditions of oxygen insufficiency, an energy gain can only be achieved by carbohydrate metabolism which means an increase of the glucose turnover and an increase in pyruvate production. Pyruvate can only be reduced to lactate under these circumstances. Because reoxydation to pyruvate is the only way for further utilization of lactate, lactate acidosis is the main symptom of anoxia in clinical chemistry. O H

A70-25083 Extreme hemodilution by volume substitution (Extreme Blutverdünnung durch Volumensubstitution). K Messmer, W Brendel, K Holper, and L Sunder-Plassmann (München, Universität, München, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 55-62 12 refs In German

Investigation of infusions of plasma expanders to determine their maximum admissible volume to substitute blood. Experiments in dogs were made indicating that dogs are able to tolerate extreme isovolemic hemodilution of 28% Hb if Dextran is used for the dilution. The experiments further show that even severe losses of erythrocytes can be compensated by infusions of plasma expanders. Moderate losses of blood volume (up to 30%) should be corrected by administration of suitable colloidal solutions to avoid serum hepatitis. O H

A70-25084 Diagnostics of hypoxia (Diagnostik der Hypoxie). W E Zimmermann (Freiburg, Universität, Freiburg im Breisgau, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 78-90 25 refs In German

Discussion of an indirect approach to the diagnosis of hypoxia by determination of excess lactate. It is shown that the determination of excess lactate is valuable in recognizing and examining important changes in the oxidative metabolism. It was not possible to find a critical level of excess lactate indicating either a manifest or reversible damage to the tissues, since too many metabolic and renal factors are involved. The shape of the excess lactate curve is however, of high prognostic importance, the damage to the tissues appears to be irreversible if the lactate excess values remain elevated or increase again despite adequate treatment. O H

A70-25085 Oxygen transport after cardiopulmonary resuscitation (Sauerstofftransport nach Herz-Lungen-Wiederbelebung). S Kampschulte, J Smith, and P Safar (Pittsburgh, University, Pittsburgh, Pa.) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 95-101 6 refs In German Army supported research

Study of oxygen transport after cardiopulmonary resuscitation from asystole and ventricular fibrillation. Since cardiopulmonary

resuscitation is, as a rule, followed by severe hypoxemia with increased alveolar-arterial PO₂ gradient and metabolic acidosis, oxygen transport after resuscitation was examined in 30 dogs. The experiments are described, and the results are tabulated and discussed. The data obtained indicate a reduction of the oxygen transport by 50-60% within four hours following resuscitation. O H

A70-25086 Avoidance of hypoxemia and acidosis during cessation of respiration (Vermeidung von Hypoxämie und Acidose beim Atemstillstand) R Schorer (Göttingen, Universität, Göttingen, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 102-108 In German

Examination of the effects of apnea of 10 min duration in halothan anaesthesia on arterial pH, pCO₂, HCO₃(-), and pO₂, as well as on the circulation. A severe respiratory acidosis with a decrease of pH to 7.18 and an increase of pCO₂ up to 80 mm Hg was observed. The partial pressure of oxygen decreased only slightly. There was no sign of a respiratory acidosis following the infusion of tris(hydroxymethyl) aminomethan, while sodium bicarbonate affected the respiratory acidosis to a minimal degree only. O H

A70-25087 On the oxygen supply of the brain in case of a cerebral edema (Zur Sauerstoffversorgung des Gehirns beim Hirnodem) K Schmidt (Freiburg, Universität, Freiburg im Breisgau, West Germany) In Hypoxia Fundamental and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 109-119 8 refs In German

Examination of cerebral venous blood gases, arterial blood gases, cerebral circulation, cerebral oxygen uptake, blood volume, blood pressure, and EEG in 37 patients with cerebral edema. The experiments showed that cerebral circulation and oxygen uptake were reduced in every case. No exact correlation could be found between oxygen uptake and cerebral circulation, and between partial pressure of arterial venous oxygen and blood volume. The cerebral circulation was decreased in cases with reduced blood volume. A statistical evaluation of these different facts revealed that the cerebral oxygen uptake depends to a great deal on the arterial oxygen saturation. Two clinical cases show the importance of the sufficient partial pressure of arterial venous oxygen. O H

A70-25088 On the evaluation of partial oxygen pressure in the hyperaemic earlobe capillary blood in hypoxemic conditions (Zur Beurteilung des Sauerstoffpartialdruckes aus dem hyperamisierten Ohrarteriellblut bei hypoxämischen Zuständen) F H Hertle, D Kafarnik, and W Schmidt (Mainz, Universität, Mainz, West Germany) In Hypoxia Fundamentals and clinical treatment, Hanns Baur Memorial Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings (Hypoxie Grundlagen und Klinik, Hanns Baur-Gedächtnis-Symposium, Mainz, West Germany, Oct 13, 14, 1967, Proceedings) (A70-25076 10-04) Edited by R Frey, M Halmagyi, K Lang, and G Thews Berlin, Springer-Verlag (Anaesthesiologie und Wiederbelebung Volume 30), 1969, p 120-124 23 refs In German

Evaluation of measurements of the partial oxygen pressure in capillary blood from hyperaemic earlobes made in 320 healthy subjects by means of a microelectrode method. The well-known

relation of partial oxygen pressure to age was confirmed. Furthermore, a significant relation was found existing between the body weight and the partial oxygen pressure. The partial oxygen pressure values in various age groups varied considerably (plus or minus 8 torr) in addition to individual variation of 7-9 torr. O H

A70-25127 # Modeling of signal-analysis processes at the periphery of the acoustic organ (Modelirovanie protsessov analiza signalov na periferii organa slukha) A P Molchanov *Akademiia Nauk SSSR, Vestnik*, vol 40, Feb 1970, p 30-37 In Russian

Discussion of the problem of modeling signal-analysis processes at the periphery of hearing on the basis of available experimental data. It is shown that with the aid of these data, it is possible to construct a functional model of signal representation at the periphery of hearing. The process of converting a signal into the parameters of a sequence of pulses in the nervous system is analyzed. The manner in which information on the signals reaches the nervous system, and the form in which this information is represented in the nervous system are examined. The respective block diagrams are given and discussed. V P

A70-25176 # The entry of oxygen into the lungs, its transport by blood, and its consumption during static loads (Nadkhodzhennia kisniu v legeni, transport iogo krov'iu i spozhivannia pid chas statichnikh navantazhen') Iu V Stepanov (*Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR*) *Fiziologichnyi Zhurnal*, vol 16, Jan-Feb 1970, p 82-89 32 refs In Ukrainian

Study of changes in the indices of external respiration, hemodynamics, the oxygen transport function of blood, and oxygen consumption during static load tests and during the restoration period. The effect of maximum static loads was investigated in tests with 36 middle-aged sportsmen who were required to hold a load for 1 min. Values of oxygen consumption in these tests were found to be considerably less than the amount of oxygen consumed in dynamical work carried out at a maximum rate on the veloergometer for 1 min. The ratio of the amount of oxygen entering the lungs to the amount of oxygen required shows that the efficiency of the organism under static loads is considerably lower than when dynamic work is performed. G R

A70-25177 # Significance of 'adrenaline test' for estimation of individual sensitiveness of animals to X-irradiation (Znachennia 'adrenalinovoi probi' v otsintsi individual'noi chutlivosti tvarin do diionizuuchikh viprominuvan') Iu M Madievskii and A S Khil'ko (Kharkiv's'kii Pedagogichnyi Institut, Kharkov, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 16, Jan-Feb 1970, p 96-102 28 refs In Ukrainian

The alterations were studied of peripheral blood leucocyte content in rats after injecting 0.25 mg of adrenaline per kg of body weight ('adrenaline test') in connection with the dependence between its value and the leucopenia level after X-irradiation. There was a real correlation between an increase in the amount of leucocytes in 'adrenaline test' and the rapidity of recovery leucocyte content in rats exposed to 50-700 r total irradiation. After exposing to 1200 r all the animals died and the above-mentioned correlation did not take place. The mean lifetime of irradiated by 500-700 r rats was also closely connected with previous 'adrenaline test' values of the same animals. (Author)

A70-25178 # State of peripheral blood circulation of persons confined for long periods of time in an open-type underwater laboratory (Stan periferichnogo krovoobigu osib, shcho trivalu chas znakhodiat'sia v pidvodnii laboratorii vidkritogo tipu) E A Akhlamov, S O Guliar, E I Gerasiutenko, and O B Khaes

(Donets'kii Medichnii Institut, Donetsk, Ukrainian SSR, Vsesoiuznii Naukovo-Doslidnii Institut Gornichoriatival'noi Spravi, USSR) *Fiziologichnii Zhurnal*, vol 16, Jan -Feb 1970, p 115-120 13 refs In Ukrainian

Investigation of the influence of various factors associated with a week's stay in an underwater laboratory, in which the pressure was kept equal to the ambient pressure, on the peripheral blood circulation of test subjects. Tests were performed with eight healthy subjects in a metal, ventilated four-compartment structure, having a volume of 28 cu m, at a depth of 14 m. The atmospheric pressure in the laboratory was kept at 2.2 atm, the temperature at 23 to 31 C, the relative humidity at 92 to 93%, the noise level at 70 to 75 dB, the mean composition of the air was 0.3% carbon dioxide, 20.85% oxygen, and 78.85% nitrogen. The water temperature (at the 14-m level) was 20 to 23 C. The subjects, clad in warm pressurized diving suits, were made to walk (at a depth of 14 m) for 30 min twice a day and perform manual work for 20 min once a day. Peripheral blood circulation was measured by means of plethysmography, capillaroscopy, and thermometry. The results (given in graphs and tables) indicate that the human organism is capable of compensating for such factors as high humidity and noise levels, low water temperatures, and effects of isolation and confinement. The test subjects became acclimatized to these conditions after three or four days. V P

A70-25179 # Adaptation to the conditions of highland areas in the Pamirs (Adaptatsiia k usloviam vysokogornymkh raionov Pamira) V G Mashkovskii and M Kh Bobokhodzhaev *Voenno-Meditsinskii Zhurnal*, Jan 1970, p 45-48 In Russian

Study of the function of the cardiovascular system of a group of 250 healthy young men exposed in the Pamirs to altitudes of 2200, 3600 and 4200 m for periods from 2 days to 3 years. The electrical and mechanical cardiac activity manifestations and their interdependence are investigated in the subjects by simultaneous EKG and phono-KG recordings under various hypoxic conditions. The development of various subjective and objective—mostly temporary—disorders, such as dryness in the mouth, bad sleep, nausea, shooting pain in the heart, and dyspnea, is noted during the adaptation period. Also noted are overextended systoles and diastoles and a sinusoidal bradycardia during the first month of exposure. V Z

A70-25180 # Investigation of the mechanisms of spatial orientation in pilots (Izuchenie mekhanizmov prostranstvennoi orientirovki letchika) V S Fomin *Voenno-Meditsinskii Zhurnal*, Jan 1970, p 57-60 In Russian

Simulation study of the mechanisms of spatial orientation of pilots during a total of 78 experiments on a group of 46 young healthy subjects with a high vestibular stability. The study is carried out in a specially designed apparatus which provides for accurate dosage of angular accelerations and velocities combined with optokinetic stimuli. Electroencephalograms, electrooculograms, arterial pressure, minute respiration volume, respiration rates and cutaneous electroconductivity are recorded during the experiments. A marked efficiency impairment is established in subjects exposed to alternating angular accelerations of 24 deg/sq sec for periods up to 20 min. Operational activity is found to be practically impossible when the vestibular and optokinetic stimuli are compounded, while the tracking ability is improved when the optokinetic stimuli interfere with the angular accelerations. V Z

A70-25220 Physiological evidence for increased tissue capillarity in rats acclimatized to high altitude. S M Tenney and L C Ou (Dartmouth College, Hanover, NH) *Respiration Physiology*, vol 8, Jan 1970, p 137-150 25 refs. Research supported by the New Hampshire Heart Association, the United Health Foundations, PHS Grant No HE-02888(11)

Attempt to provide physiological evidence of an increase in tissue capillary density in rats acclimatized to high altitude and by measuring 'tissue diffusing capacity' based on the uptake rate of low concentrations of CO from subcutaneous gas pockets in the animals. On this basis it was determined that three weeks of acclimatization to an equivalent altitude of 5600 m resulted in a roughly doubled uptake rate. When corrections for the contribution of the secondary polycythemia were made, and using certain simplifying assumptions, it was deduced that acclimatization resulted in a 50% increase of capillary number. The effect of this change on oxygen partial pressure in the most distal sites of a diffusion cylinder have been calculated on the assumption that gas pocket oxygen partial pressure represents regional venous oxygen partial pressure. The value is more than 10 mm Hg below sea level control at 5600 m, but is still well above zero, which would not be the case without increase of capillarity. Experiments to test the effect of acclimatization to lesser altitudes indicated no effect on capillarity in a three-week period when the altitude was below 4100 m. (Author)

A70-25230 * State space models of remote manipulation tasks. Daniel E Whitney (MIT, Cambridge, Mass.) *IEEE Transactions on Automatic Control*, vol AC-14, Dec 1969, p 617-623 19 refs. Grant No NSG-107-61

A state variable formulation of the remote manipulation problem is presented, applicable to human supervised or autonomous computer-manipulators. A discrete state vector, containing position variables for the manipulator and relevant objects, spans a quantized state space comprising many static configurations of objects and hand. A manipulation task is a desired new state. State transitions are assigned costs and are accomplished by commands: hand motions plus grasp, release, push, twist, etc. In control theory terms the problem is to find the cheapest control history (if any) from present to desired state. A method similar to dynamic programming is used to determine the optimal history. The system is capable of obstacle avoidance, grasp rendezvous, incorporation of new sensor data, remembering results of previous tasks, and so on. (Author)

A70-25240 * Ultraclean technology. L B Hall (NASA, Washington, D C) *Science Journal*, vol 6, Apr 1970, p 41-46 7 refs

Survey of the current state of development of ultraclean technology which eliminates traces of pollution that are normally present even in ordinary clean rooms. The development of ultraclean rooms is followed from the initial turbulent flow rooms, through the later used horizontal laminar (crossflow) room, and finally to the recent vertical laminar (downflow) rooms. Costs of ultraclean operations are analyzed, and different types of facilities are examined in terms of contamination levels. T M

A70-25306 Analog investigation of the process and the influencing factors of periodical skin temperature variations at the finger tips (Etude analogique du mécanisme et des facteurs du phénomène d'oscillations périodiques des températures cutanées à la pulpe digitale) M Gautherie (Strasbourg, Université, Strasbourg, France) *Acta Electronica*, vol 12, Oct 1969, p 313-338 25 refs In French

The temperature of the human skin at finger tips undergoes periodical variations, the average values of the period and amplitude of these variations are respectively 1 min and 1 deg C. The author, who has described this observation in an earlier work, investigates in this paper the process and leading factors of these variations by means of infrared thermometry. He shows first that the origin of these oscillations are the periodical variations of nerve-impulse frequency in vasoconstrictor orthosympathetic fibers. Then, from various physio-pathological observations and with the help of a model consisting of a transistorized relaxation oscillator, he analyses the behavior and effects of the different factors: blood flow, blood

A70-25307

temperature, the vasodilator and vasoconstrictor agents, age of the subject and the surrounding temperature. Finally, a cybernetic model is proposed, which brings to evidence two important phenomena: on the one hand, the existence of a negative feedback making spontaneous oscillations possible; on the other hand, an influence of the ambient temperature on the feedback loop, which makes the system similar to a servomechanism contributing to the thermal regulation in fingers between 6.5 deg C and 36 deg C. (Author)

A70 25307 Medical thermograph (Thermographe médical) P. Wurtz (Laboratoires d'Electronique et de Physique Appliquée, Limeil-Brevannes, Val-de-Marne, France), *Acta Electronica*, vol. 12, Oct. 1969, p. 339-351. In French.

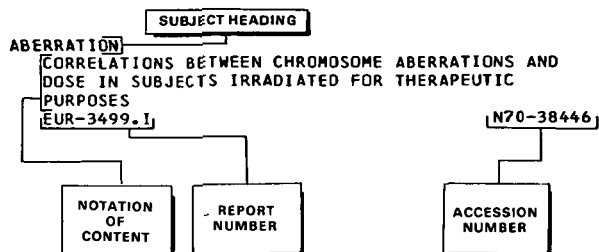
Description of an improved medical thermograph with modified characteristics of the image pick-up device and additional equipment for thermal analysis of scenes. The spectral sensitivity range of this thermograph is about 10 microns, and the temperature sensitivity is 0.1 C. An equipment for thermal profile display is included. In addition, the isotherms can be recorded in color. Z W

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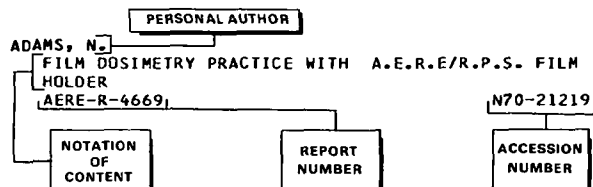
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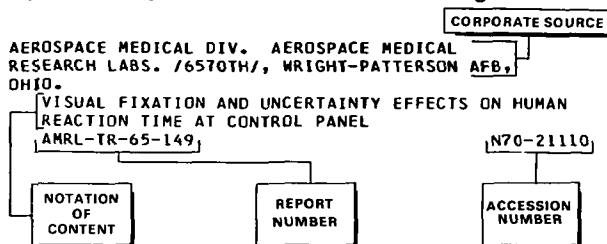
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